PROCEEDINGS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY

HELD AT PHILADELPHIA

FOR

PROMOTING USEFUL KNOWLEDGE

VOL. XXXVIII.

JANUARY TO DECEMBER, 1899

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AMERICAN PHILOSOPHICAL SOCIETY

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VOL. XXXVIII. JANUARY, 1899. No. 159.

Stated Meeting, January 6, 1899.

Vice-President SELLERS in the Chair.

Present, 16 members.

Acknowledgments of election to and acceptance of membership were read from Messrs. Edward P. Crowell, Henry S. Pancoast, Edward H. Keiser, Ernest W. Brown, Francis Rawle, Paul Leicester Ford and Charles M. Hall.

The decease of Prof. Ezra Otis Kendall, at Philadelphia, on January 5, 1899, was announced and it was ordered that the President be requested to appoint a member to prepare an obituary notice of the late Vice-President of the Society.

The Judges of the annual election for Officers and Councillors held this day between the hours of two and five in the afternoon reported that the following-named persons were elected according to the laws, regulations and ordinances of the Society to the offices for the ensuing year:

President.

Frederick Fraley.

Vice-Presidents.

Coleman Sellers, Isaac J. Wistar, George F. Barker.

Secretaries.

I. Minis Hays, Frederick Prime, Samuel P. Sadtler, Richard A. Cleemann.

PROC. AMER. PHILOS. SOC. XXXVIII. 159. A. PRINTED JUNE 17, 1899.

Curators.

J. Cheston Morris, Benjamin Smith Lyman, Henry Pettit.

Treasurer.

Horace Jayne.

Councillors.

(For three years.)

William A. Ingham, Charles S. Wurts, George F. Edmunds, James T. Mitchell.

(For one year to fill an unexpired term.)

Henry C. Trumbull.

Dr. I. Minis Hays read a "Note on Penn's Commission for the Government of Pennsylvania during his Visit to England in 1684."

Dr. I. Minis Hays was nominated for Librarian for the ensuing year.

The Society was adjourned by the presiding officer.

A NOTE ON WILLIAM PENN'S COMMISSION FOR THE GOVERNMENT OF PENNSYLVANIA DURING HIS FIRST VISIT TO ENGLAND IN 1684.

(Plates I and II.)

BY I. MINIS HAYS, M.D.

(*Read January 6, 1899.*)

On March 4, 1681, Charles II granted a charter, in which he made William Penn full and absolute Proprietor of that dominion which is now called Pennsylvania, and invested him with the powers of government of the same. Penn sailed for America on the 6th of August of the following year and landed at New Castle, on the Delaware, on October 24. He at once set about establishing his government and aiding the Quakers, who had emigrated under his auspices, in regulating their affairs in the colony, until in 1684 the dispute between Lord Baltimore and himself concerning the boundary of their respective provinces and the critical condition into which other of his important affairs had been thrown by his enemies

during his absence in America rendered his presence in England necessary.

He therefore departed for home in June, 1684, but before so doing it was necessary to provide for the government of his province in his absence, and to this end, he executed a commission on the same day that he set sail, lodging in the hands of the Provincial Council the powers of government vested in him, and he appointed Thomas Lloyd, who also held a commission to keep the great seal, its President.[1]

In the Minutes of the Provincial Council it is stated that "at a Councill held at New Castle the 18th of ye 6th Month 1684 a commission from ye Govr was read, Impowring the Provll Councill to act in the Governmt in his Stead, Ths. Lloyd being Presidt of ye same."[2]

In the Minutes of 31st of January, 1686, P.M., it is also stated that "The commission from ye Govr to ye Provll Councill Impowring them to act in his stead, with ye memorandum on the back side thereof was Read."[3]

Neither the text of this commission, nor the important memorandum on the back is given, nor, so far as I can learn, have they ever appeared in print. I have been so fortunate, however, as to find the original document among some unarranged papers in the possession of this Society, and it bears no marks upon it to show that it was ever recorded. It seems, therefore, desirable that the text of this important document should now be made available to students of the history of this Commonwealth, as well as the memorandum on its back, which is referred to in the second record in the Minutes of the Provincial Council, which was executed on the same day on board the Ketch Endeavour just as Penn was about to sail for home, and which very materially restricted the large powers he had just previously on the same day granted in the original instrument. It constitutes another example of what has frequently been observed, that man's first impulses are more generous than his second thoughts.

The following is the text of the commission:

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[1] Minutes of the Provincial Council of Pennsylvania. Published by the State, Vol. i, p. 66. Harrisburgh, 1838.

[2] *Ibid.*

[3] *Ibid.*, p. 120.

"WILLIAM PENN PROPRIETARY AND GOVERN^{R} OF Y^{E} PROVINCE OF PENNSYLVANIA AND Y^{E} TERRITORIES THEREUNTO BELONGING.

"To y^{e} members of y^{e} Provincial Councill of y^{e} Province of Pennsilvania & y^{e} Territories thereunto belonging.

"Since it hath pleased God so to dispose of me as to call me by his Providence into England and t^{y} it is requisite that y^{e} Power I have should be left to maintain & exercise Govern^{t} for y^{e} Good of the Province and Territories: To y^{e} end that y^{e} People may be sensible of y^{e} Intire Confidence I have in them w^{ch} which I hope will begett the like in them, to me & mine, I doo hereby committ y^{e} Power vested in me to you their chosen Provinciall Councill & do hereby Nominate & appoint my Trusty & Loving Friend Thomas Lloyd President of y^{e} same, he & you to Act & doo all things, that by Law and Charter you may doo for y^{e} Good of y^{e} Province, & not to y^{e} Detriment of me my Heirs & Ass:gns, which power shall remain as Granted, till further Ord^{d}. Given at Philadelphia y^{e} Sixth day of y^{e} Sixth Month One Thousand Six Hundred & Eighty-four being y^{e} Thirty-Sixth Year of y^{e} King's Reign & y^{e} Fourth of my Government.

"WM. PENN."

On the back of the commission is the following inscription in a different handwriting:

"Memor^{d}

"By the Power within expressed & mentioned I understand y^{e} use of the executive power cheifly as chuseing officers &c. Intending y^{t} all law y^{t} shall or may be made should receive and have my further determination, confirmination and consent or else to be voyd in themselves.

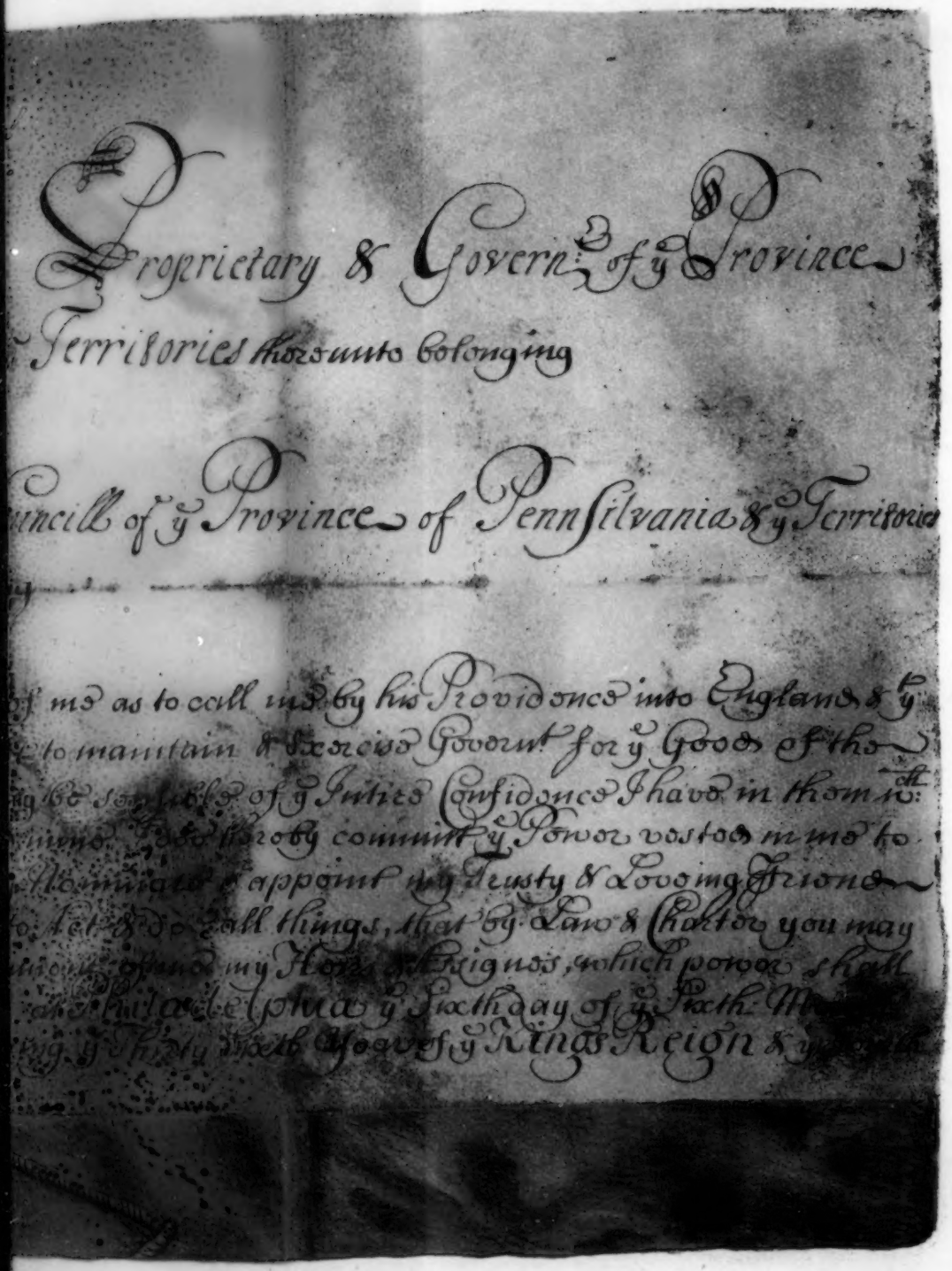
"Given y^{e} day of y^{e} within date on board the Ketch Endeavour.

"6th 6th mo. 1684. "WM. PENN."

A facsimile of the commission and of the memorandum endorsed thereon is appended:

William Penn Proprietary &
of Pennsilvania &c Territories thereunto
To ye Members of ye Provincial Councill of ye Province
thereunto belonging
Since it hath pleased God so to dispose of me as to call me by h
it is requisite that ye Power I had should be left to maintain & exercis
Fframes & Traitors. To ye end that ye People may be sensible of ye Priv
which I hope will beget in them love & mine I do hereby com
You their chosen Provinciall Councill, & do hereby Nominate & appoint
Thomas Loyd President of ye same to act & do all things
doe for ye Good of ye Province & not to ye Detriment of my Hon
roman as Grant & till further Ord Given at Philadelphia
One Thousand Six Hundred Eighty Four being ye Fifty Sixth Yea
of my Governmen

Fac-simile of Penn's Commission for the Government of Pennsylvania during his first v
England, 1684, in possession of the American Philosophical Society.



Proprietary & Govern.r of y Province
Territories thereunto belonging

uncill of y Province of Pennsilvania & y Territories

of me as to call me by his Providence into England & by
to maintain & exercise Power for y Good of the
ng be Satisfied of y Justice Confidence I have in them &
mine I do hereby commit y Power vested in me to
Nominate & appoint my Trusty & Loving Friends
to Act & Do all things, that by Law & Charter you may
in my Name & Reigns, which power shall
the Date hereof for y Sixth day of y Sixth Month
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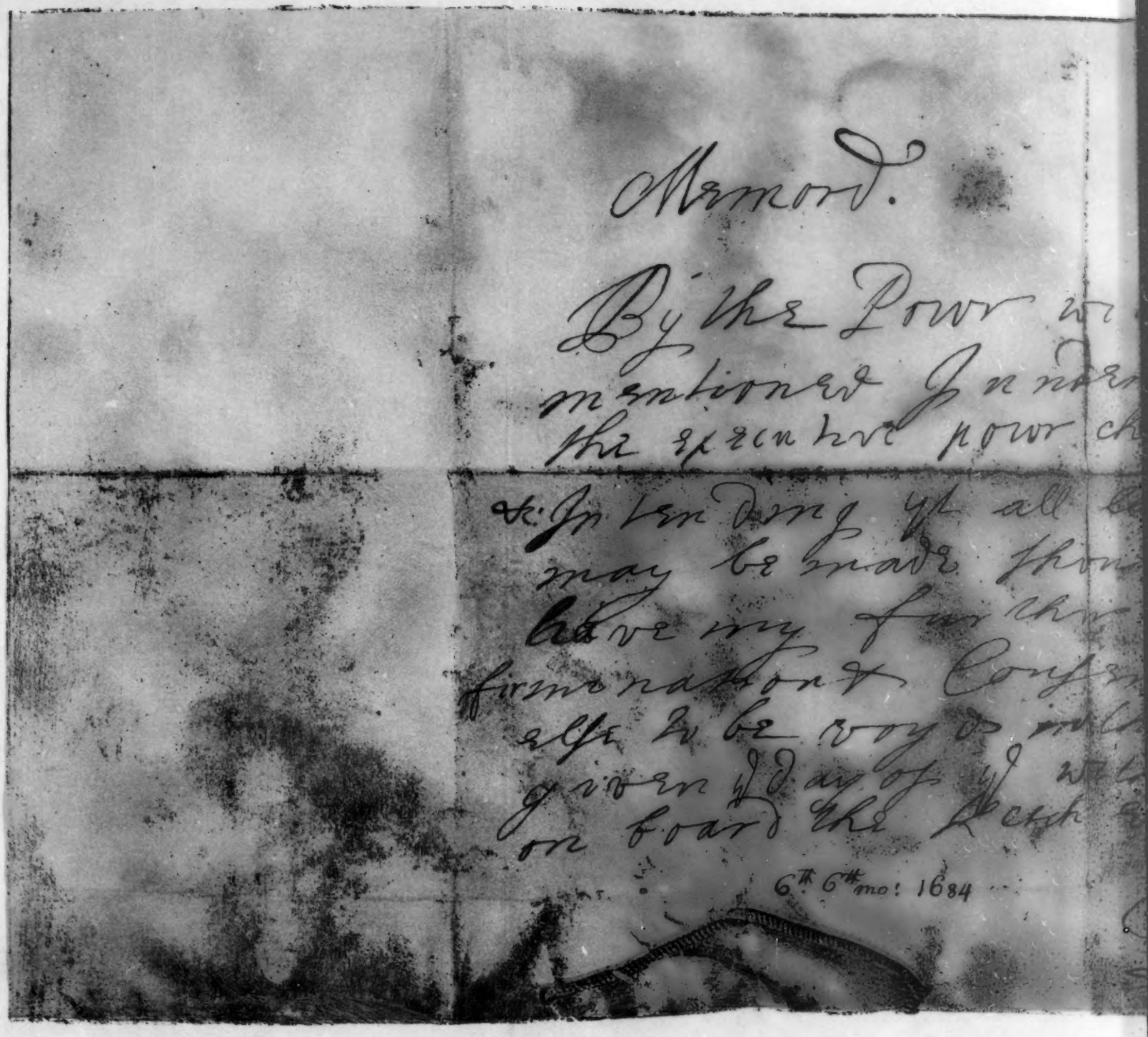
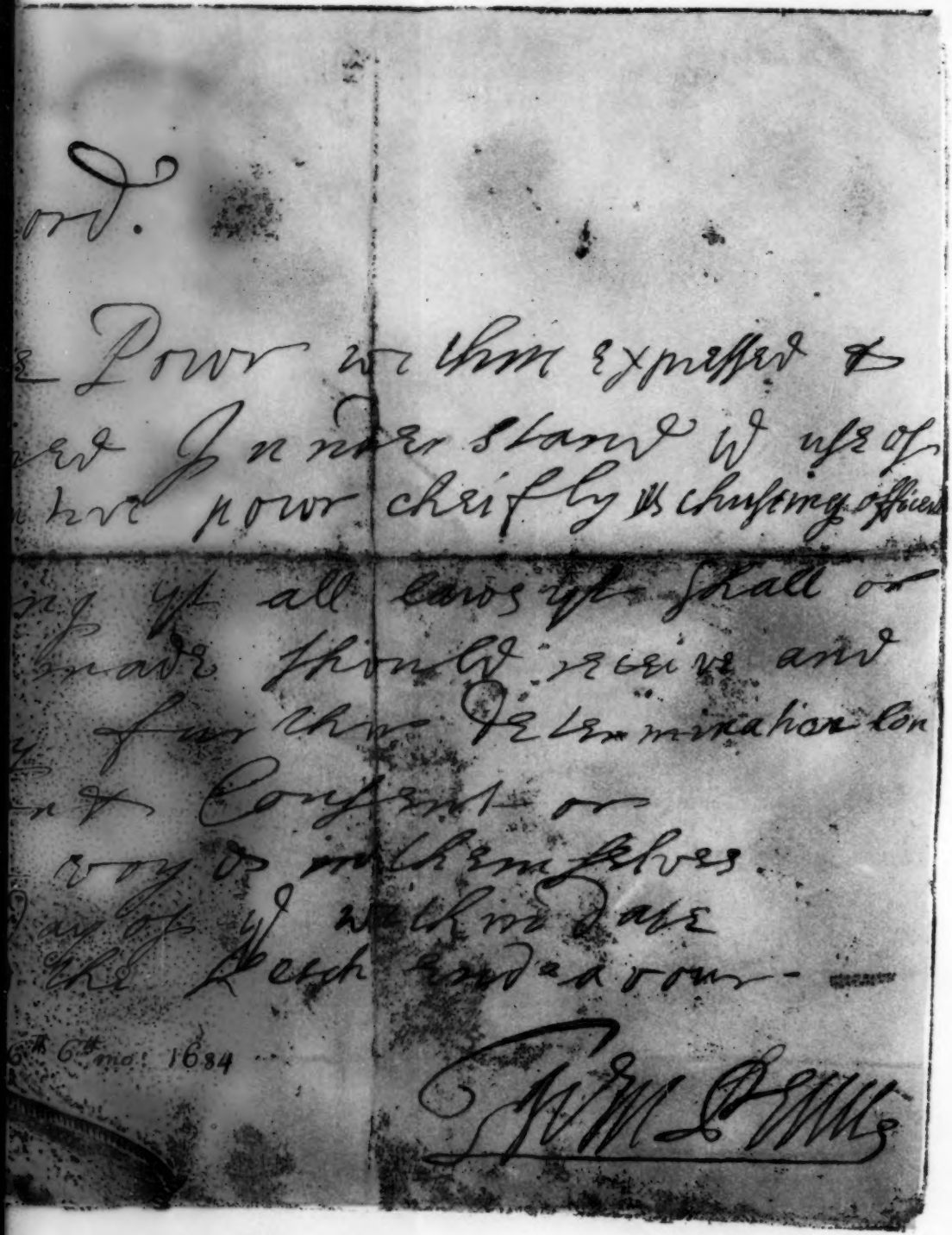
ient of Pennsylvania during his first visit to
ican Philosophical Society.



Fac-simile of Penn's Commission for the Government of Pennsylvania during his first visit t
England, 1684, (Reverse) in possession of the American Philosophical Society.



nment of Pennsylvania during his first visit to
of the American Philosophical Society.

Stated Meeting, January 20, 1899.

Vice-President SELLERS in the Chair.

Present, 12 members.

The death of Major Jedediah Hotchkiss, of Staunton, Va., a member of the Society, was announced.

A verbal communication was made by Mr. Wadamori, of Japan, upon "A New System of Mnemonics."

A paper entitled "Photometric Researches," by Prof. Hugo Seeliger, of Munich, Bavaria, translated and edited by Prof. A. W. Myers, of the University of Illinois, was offered for the *Transactions*, and on motion was referred to a Committee consisting of Profs. E. C. Pickering, C. L. Doolittle and M. B. Snyder.

A communication for the *Proceedings* from Mr. A. Radcliffe Grote, on "Specializations of the Lepidopterous Wing; the Parnassi-Papilionidæ. I," was read.

Dr. I. Minis Hays was elected Librarian for the current year.

Pending nominations Nos. 1477, 1478, 1480, and new nominations Nos. 1481, 1482, 1483, 1484, 1485, 1486, 1487, 1488 and 1489, having been read, the meeting was declared adjourned.

SPECIALIZATIONS OF THE LEPIDOPTEROUS WING; PARNASSI-PAPILIONIDÆ.

I.

BY A. RADCLIFFE GROTE, A.M.

(*Read January 20, 1899.*)

This communication embodies results obtained from a study of the neuration of the types of genera proposed in literature in the Papilionides. It may be considered as a contribution to phylogeny in the group, from the fact that it exhibits the characters of specialization recognized by me in the structure of the wings, while the inference is accepted that the more specialized are also the younger

forms. It may also be looked upon as a contribution to taxonomy, because the differences noted may find their place in generic descriptions and serve to regulate the extension of minor groups of the species.

I have divided (February, 1897) the Butterflies, or diurnal Lepidoptera, into two major groups, which may be thus defined:

Vein ix of fore wing present; not more than one internal vein on hind wing . . . . *Papilionides.*
Vein ix of fore wing absent; at least two internal veins on hind wing . . . . . *Hesperiades.*

The characters given above to the Papilionides seem, at least in combination, exclusive of all other hitherto discovered Lepidoptera. The opposed characters will not exclude larger groups of the Moths from the Hesperiades. With the latter the present study is only incidentally concerned. Following modern classificatory notions, I have given to the names of these two major groups of the Butterflies an accepted termination (*ides*), and I would attach to each the taxonomical value of a superfamily. This course seems to be additionally warranted if we accept my assumption that the two groups are not immediately connected, their phylogeny distinct and that no nearer blood-relationship exists between them. These two major groups of the Butterflies have, I am led to believe, developed themselves independently, so that the obvious characters which would unite them have been secondarily acquired, and constitute a parallelism in development. The absolute character of a primary nature which separates the Papilionides from the rest of the diurnals is the presence of vein ix on primaries. The neurational characters, used here to divide the Papilionides into family and subfamily groups, are in their nature secondary, gradational and recurrent; in other words, characters of specialization only.

Characters of Specialization.

The first direction in which specialization shows itself lies in the suppression of the media on both wings. In this generally expressed direction the Papilionides show a course parallel with that undertaken by the Pieridæ, with the difference that the middle

branch of the media, vein iv_2, becomes cubital; whereas in the Pieridæ it becomes radial, as in the Hesperiades generally, with the exception of Leptidia, an aberrant pierine form in which this branch also becomes cubital on the hind wings. In the Lycænidæ-Hesperiadæ it remains central, while it becomes radial in the Nemeobiidæ, as in the Pieri-Nymphalidæ. The upper branch of the media, vein iv_2, ascends the radius in the specialized forms of the Papilionides, as in the Pieridæ, and does not remain permanently attached to the cross-vein, from the upper corner of the cell, as in the Nymphalids.

The second direction in which specialization shows itself lies in the suppression of the branches of the radius on the fore wings. The five-branched radius, exhibited in a generalized state in the Papilionidæ, becomes four-branched in the most specialized butterflies of the group I have yet examined, in *Parnassius apollo* and its very close ally, *Doritis mnemosyne*.

For the rest, the specializations of the neuration generally show themselves in absorption, so that I have laid it down as a principle that the amount of the specialization is measured by the extent of the absorption or disintegration.

The so-called "tails" to the hind wings in this group are prolongations of vein iv_2. They are probably to be regarded as characters of specialization, and they possibly had their origin as secondary sexual ornaments of the male sex, although now most of the females have followed suit. In certain Papilios in which the female is mimetic, the "tail" in this sex may have been abandoned after having been originally acquired.

Nomenclature and Homology of the Veins.

The ancestors of the Papilionides must have exhibited vein ix of the primaries, since this is evidently a retained and not an acquired character. I follow Comstock in numbering the loop at the base of vii as viii in the Hesperiades and other groups. This vein viii is absent in the Papilionides, where there is no place for it. It may have originated in a splitting of vii at base, and not be a relic of a longitudinal separate vein. In this case the number assigned to ix would be incorrect, but the numbering having been introduced, to change it would make confusion, although the vein

itself would be homologous with vein viii of hind wings and not with vein ix of the same pair.

The cross-vein between cubitus and vii very gradually fades out in the more specialized forms of the Papilionides and finally disappears. It fades from its base, where it joins on to vii, upwardly, becoming a mere remnant in the Teinopalpidæ, extending below the cubitus. Mr. Quail has discovered a similar slight blotch in *Anosia*, and I believe correctly homologizes it with the cross-vein of *Papilio*. I have found it still more extended in *Heliconius*, where it reaches, running a little obliquely downward, to about the place where vi would be had this latter vein not faded completely out. In my preparation and the original photograph of *Heliconius* this fragment of the cross-vein is with difficulty to be seen, and I overlooked it at the time. I also failed to notice that *Heliconius* shows a trace of vein viii.

The presence of relics of a cross-vein below cubitus in the Limnadidæ and Heliconiidæ, homologous with that in *Papilio*, does not necessarily imply consanguinity between the groups. The hypothesis has suggested itself to me that the lepidopterous wing may have originally shown a series of longitudinal and independent veins, connected by a system of cross-veins, and without the present furcations of the branches of the media and radius. The disappearance of the cross-veins would allow of the contact of the longitudinal veins, and probably assist the shifting movements we now perceive in action (PROC. AM. PHIL. SOC., Jan., 1898). The cubital cross-vein would be a relic of these.

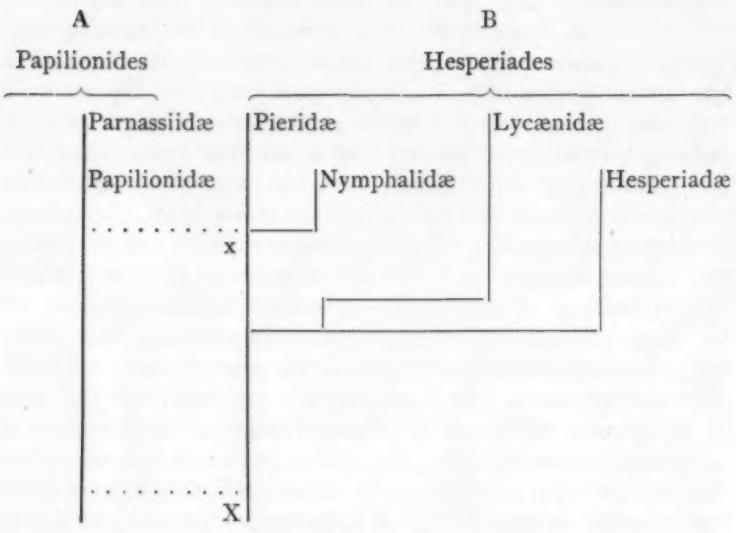
GENERAL CLASSIFICATION.

If we assume vein viii of the fore wing in the Hesperiades to be a splitting of the vein vii at base, it might not be held to be homologous with the vein viii, occupying the same position, in the Sphingides and other groups of moths. This supposition seems to me untenable. In the lycænid genera *Aurotis*, *Zephyrus* and *Feniseca* I do not perceive any difference in this vein from its appearance in the Hesperiadæ. It becomes simply more prominent and somewhat less strap-like and rigid in the moths. In any case, this vein viii, while allying the Hesperiades to the higher groups of moths, is absent in the Papilionides and is replaced by

what I consider to be the undoubted relic of a true longitudinal vein, taking an opposite direction to vein viii, and running outwardly and downwardly to the inner margin of the wing, and which I have called vein ix. If the view is accepted that vein viii originates in a splitting of vein vii at base, then it might be held that this splitting occurred after vein ix had been gotten rid of, and that consequently butterflies with vein viii represent a succeeding stage in this respect. I believe to have shown that, in certain of the more specialized of the Hesperiades, vein viii gradually fades out. In the Nymphalids I find very faint traces of it only in certain Argynninæ. I have found no trace of it in any Satyrid. It has vanished in *Leptidia*, is present in *Pseudopontia*, and, while strong in *Colias*, is fainter in some of the other Pierinæ. Certain Lycænidæ appear to have lost it, or it is very faint, and this may be the case also with some Hesperians, though in this latter group it is usually quite legible. Conceding its variability, no better evidence perhaps of its power of extinguishment can be offered than that it is strongly marked in *Libythea* and *Limnas*, and that it is incomplete in the related *Heliconius*.

Let our theories as to viii be as they may, one thing seems clear: that no traces of vein ix of the Papilionides have been found in the Hesperiades, and that this latter group is held together, as opposed to the former, by the negative character of its absence.

My attempt therefore, to connect the Papilionides with the rest of the diurnals, has failed. In my first draft of the genealogical tree (1896–1897), and which is still pinned above my desk, I supposed that the point of contact might be with primitive forms, less specialized than the Hesperians. These would have all exhibited vein ix, which the Papilionides had retained, while the other ascending branch had lost it. I reproduce here this sketch, the readier since Dr. Chapman, in letters to me, has queried whether an analogous scheme might not work.



The point x is supposititious and, in my original sketch, marked with a query. I had endeavored also to connect the Papilionides with the Nymphalids. Aside from the major difficulty, the only point of similarity I could then find was the five-branched radius, which in both the Papilionidæ and in the Nymphalids was in a generalized condition. To this must be added traces of the cubital cross-vein in the Limnadidæ and Heliconiidæ. While too much importance should not be paid to a suppression of branches of the radius now in a fluid state, as in the Pieridæ and Saturniadæ, stress must be laid on the fact that throughout the Nymphalids the five-branched condition is retained, while in the Parnassians we have also a four-branched type, in which the more generalized five-branched condition has been very clearly abandoned. The only movement I have found in the Nymphalid radius consists of a transference of iii_2 to beyond the cell in the Heliconiidæ and certain long-winged forms, or in forms perhaps tending in that direction, such as *Thalerope*, *Araschnia*, *Melitæa* and *Euptoieta*; while in the long-winged forms, *Agraulis*, *Dione*, the vein iii_1 has followed suit. A trace of this movement is seen in *Argynnis*, but not in *Issoria lathonia*. I was also impressed by the fact that in the Papilionidæ vein iii_4 did not attain the apex of the primary wing,

but this condition is not constant in the Nymphalidæ, and is abandoned in the Satyrids and *Libythea*. On the other hand, the differences between the Papilionides and Nymphalidæ are numerous. Vein iv_2, the middle branch of the media, becomes radial in the latter, in the former cubital, in specialization. Vein iv_2 also leaves the lower outer corner of the cell in the Papilionidæ, and, although this position is abandoned in the higher genera of the Parnassiidæ, still it may have been a primitive one, since it occurs now with the more generalized forms. The peculiarities of the papilionid wing are very strong, and notwithstanding the discovery of a remnant of the cubital cross-vein in *Anosia* (Danaus) by Mr. Quail, and by myself in *Heliconius*, I cannot find evidence sufficiently weighty to connect the groups from the neuration. But while the coincidences allow of some comparison of the Papilionides with the Pieri-Nymphalidæ, although an affinity appears to me to be illusory, it is impossible to consider them as representing in any nearer way an ancestral form of the Lycæni-Hesperiadæ.

Upon the generalized condition of *Hesperia* too much stress has, perhaps, been laid in literature. All the forms of which I have examined the neuration seem relatively specialized upon their peculiar plan of venation, of which the more modern and advanced outgrowths are to be found in the Lycænidæ, culminating in *Thecla*. But all the butterflies belonging to the Lycænid-Hesperid phylum seem relatively too specialized as to represent adequately the primitive form of the diurnals. Whatever the primitive form was like, the only character in which it may have resembled *Hesperia*, or the primitive form of the Charaxinæ, is that of the separation of the longitudinal veins. The primitive butterfly may have had separated veins, together with cubital cross-veins, of which we find a trace in the Heliconians and Limnads, and an anal vein, like the Papilionides, on the primaries. And, perhaps, by conjuring up a creature rejoicing in apparently residual features, we might attain to a picture in somewhat like manner as Gabriel Max has painted Haeckel's *Pithecanthropus alalus europæus*. But the muse of morphology, as I am now able to understand her, abandons me at this juncture, with the unconnected threads of the groups A and B, the Papilionides and Hesperiades, dangling downwards into the abyss of Time, kept apart by the presence of vein ix of primaries in the one and its absence in the other.

The object of my communications upon the wings of butterflies,

of which this series is the last, has, however, been attained in demonstrating that modern classificators (I need not recapitulate their names) have been in error in intercalating the Swallowtails between the Blues and the Skippers. In thus doing violence to the characters of the insects, they have separated two allied groups by the interpolation of a third, not at all nearly related to either. I have further shown that we cannot bring in the Papilionides *after* the Hesperiadæ, since this course would break the sequence of character which allies the Hesperiades with the higher groups of the moths, the Sphingides, Saturniades, Bombycides (Agrotides). I do not assert a belief that the Hesperiades have sprung from common ancestors with these, but I find nothing in the neuration to render the idea improbable. And I am compelled to add, upon such evidence as is accessible to me, that I cannot say the same of the Papilionides, all connection of which with any of the above-mentioned groups appears to me to present a high degree of improbability. What discoveries await us in the future no one can say, and a naturalist can only come to a conclusion upon the material before him.

The notion that the Papilionides are generalized forms appears to me to be alike overstated. I lay especial stress upon the fact that the hind wings show but one internal vein, whereas all the Hesperiades show two at least. How the outer vein has been gotten rid of is plainly to be traced in the Papilionides, viz., in the same manner as the shortening and weakening of the inner vein has been gradually effected, from where it is stout and long, as in *Ornithoptera*, to where it becomes weaker, more curved and shorter, in *Parnassius*. This shortening of the vein is accompanied by a hollowing away of the tegument along the inner margin. A perfect parallel in this movement is sustained between the Papilionides and Saturniades. More than this: I believe I have found in the rounded and full inner margin of the secondaries in *Ornithoptera* an earlier stage of the hollowed margin of *Papilio*. For this reason, among others, I look upon *Ornithoptera* as being a relatively generalized form in the group. The ancestors of *Papilio* might have had two internal veins on secondaries, and in this they would have resembled the Hesperiades. From this point of view the inference is irresistible that we should commence our lists with the Papilionides. The specialization of the radius on fore wings keeps pace with the shortening of vein viii on hind wings in the Parnassiidæ.

In taking a fresh view of the evolution of the neuration, one is only too liable to overlook minor characters, or again to lay undue stress upon them. But, if I am correct in my major conclusions, if the theory in the main adequately explains the facts, such faults may be eliminated and forgiven. A well-founded division of the butterflies into two larger groups, of equal morphological value, must be considered as a gain to taxonomy, while it eases the study of the waste of butterflies to a hitherto unknown extent. I try to show, not only that the Parnassi-Papilionidæ belong together, but that all the rest of the butterflies are correctly associated in a second group. I have broken the Papilionides away, not only from their supposed affinities with the Whites, but from their incongruous placement with the Skippers also. In the former case I differ from Mr. Reuter, in the latter from Mr. Scudder. It seems to me that light is thus thrown upon a subject on which much has been written which must now appear purposeless, while the new course would enable us to carry with greater certainty the apparatus of classification along the road of phylogeny.

Material.

The authority for the generic names and types which I have here consulted, is Mr. Scudder's *Historical Sketch of the Generic Names Proposed for Butterflies*, Salem, 1875. I regret not to have been able to procure information or material of several generic types published since this date in the Papilionidæ. For specific determinations I am largely indebted to Dr. O. Staudinger and A. Bang-Haas, Blasewitz, Dresden. As far as possible I have studied the neuration of the female sex, since here the question of secondary sexual character is for the most part excluded. Where the male alone has been examined the sex is indicated. Following Mr. Scudder's work, I have omitted to cite the author to the generic type.

Classification of the Papilionides.

The characters are taken from the position of the veins and their condition. These characters are offered by the neurational movement peculiar to the Papilionides, of which they constitute existing stages, and are hence secondary and characters of specialization only. They are here amplified from my original communication

contained in *Mittheilungen aus dem Roemer-Museum*, Hildesheim, No. 8 (February, 1897).

On primaries vein iv_1 is radial or radially inclined, vein iv_2 is cubital.

No traces of cubital cross-vein . . . . PARNASSIIDÆ.

Radius four-branched, specialized *Parnassiinæ*.

Radius five-branched, generalized *Zerynthianæ*.

Traces of cubital cross-vein . . . . . TEINOPALPIDÆ.

On primaries vein iv_1 from, at or near middle of cross-vein; vein iv_2 from the lower outer corner of cell equidistant, or nearly so, between iv_1 and iv_2.

A cubital cross-vein reaching vi or vii . PAPILIONIDÆ.

Fam. I. PARNASSIIDÆ.

Subfam. 1. *Parnassiinæ*.

The radius is four-branched, specialized. There appear to be only two genera in this subfamily, since *Doritis*, with the type *mnemosyne*, does not seem distinct from *Parnassius*, with the type *apollo*. These two genera may be separated as follows:

Vein iv_1 from radius beyond the cell . . . . 1. Parnassius.

Vein iv_2 from cross-vein . . . . . 2. Hypermnestra.

Parnassius apollo.

In all the species of *Parnassius* I have yet seen, vein iv_1 issues from radius, but since in the succeeding group this vein is fluid in *Zerynthia*, the character may not always hold. In both *apollo* and *mnemosyne* vein iii_2 arises a little before the point at which the cross-vein joins the radius, but, in *Hypermnestra*, *at* this point. I have been hitherto in error as to the absorption of i and ii at base in *Parnassius*. The lower vein is partially degenerate, but distinctly present in both *apollo* and *mnemosyne*. My figures must be corrected in this respect. This Papilionid feature is then retained throughout the group. It is the lower branch, the base of vein ii, which here seems to fade away. The upper branch, vein i, is united by a cross-vein, according to Comstock, with vein ii in *Papilio*. This short cross-vein appears then to become fused with and a continuous part of vein ii, its real base, while all that remains of it is the "præcostal spur." This may be the true termi-

nation of vein i, the alternative being that the "præcostal spur" is homologous with the shoulder veins of the Lachneidæ. But, in *Papilio machaon*, it is the base of vein i which clearly shrinks, vein ii being strong and continuous. In *Parnassius* the præcostal spur appears to emerge from vein ii, and the cross-vein has become absorbed.

Hypermnestra helios (♂).

Characterized by the extreme diminution of the humeral cell of secondaries, which is so reduced as at first to escape notice. The position of vein iii_2 shows an advance upon *Parnassius*, while in that of iv_1 it lags behind its ally. Else the neuration of the two generally agrees.

Subfam. 2. *Zerynthianæ*.

This subfamily must take its name from *Zerynthia* Ochs., 1816, because *Thais* Fabr., 1807, which is the older title for the same type, is preoccupied (Scudder, *l. c.*, 279). Not observing this, I originally used for it the name *Thaidinæ*. No other author, so far as I know, had proposed this division of the Parnassiidæ, which in itself seems a natural one. The Zerynthianæ are intermediate, in the specialization of the wings, between the Parnassiidæ and the Papilionidæ.

Radius five-branched, generalized:

Internal vein (viii) of hind wings relatively short, not reaching anal angle ..... *Archon.*

Internal vein (viii) of hind wings reaching anal angle:

Hind wings without special prolongation of vein iv_3 ..... *Zerynthia.*

Hind wings with slight special prolongation of vein iv_3 ..... *Luehdorfia.*

Hind wings with a long "tail" to vein iv_3 and also shorter prolongations to veins v_1 and v_2 ..... *Armandia.*

Hind wings with only a long "tail" to vein iv_3 ..... *Sericinus.*

Archon apollinus.

A character of specialization is found in the shortened and bent internal vein of secondaries which follows the inward

curve of the margin, as in *Parnassius* and the Saturniades. This character is probably more recently acquired. The neuration else shares the main features of that of its group. The humeral cell is narrow and reduced, the lower vein (base of ii) being weaker. On primaries vein iv_1 springs from the cross-vein. Although the pallor of the ground color of the wings suggests the preceding subfamily, the pattern of ornamentation (on the value of which for taxonomical purposes I have been insisting upon for more than thirty years past) is distinctly Zerynthian. The discal blotches are intermediate between the bands of *Zerynthia* and the spots of the Parnassians and show the origin of the latter. The subterminal red-marked fasciæ are like *Zerynthia*. *Archon* may be regarded as a generalized form of *Parnassius*, showing the origin of the latter from *Zerynthia*-like ancestry.

Zerynthia polyxena.

The material examined shows that vein iv_1 is in a fluid state. In a female this vein leaves the extreme upper corner of the cell. In the male it has passed beyond the cell and issues from the radius. In a female of *rumina*, figured by me (*Mittheilung a. d. Roemer-Museum*, No. 8, Taf. 1, Fig. 2), it leaves the cross-vein. Not only this vein varies in position, but also vein iii_3, which is further removed outwardly in the specimen in which vein iv_1 leaves the radius. Sufficient material has not been examined to gauge the extent of these variations, but it seems unlikely that they are sexual. As compared with *Archon*, the internal vein of hind wings is less bent and reaches the anal angle, the humeral cell is a little wider, else the neuration generally agrees. Traces of a splitting of vein ii at base appear on fore wings.

Luehdorfia puziloi.

The neuration of the female examined agrees exactly with that of *Zerynthia rumina*. Except that the margin of secondaries is more uneven, and that vein iv_3 is produced into a short "tail," no differences whatever have been noted. Vein iv_1 leaves the cross-vein. The forms in which vein iv_1 is still attached to the cross-vein must be regarded as more generalized than those in which it has ascended the radius and is thrown off beyond the cell.

Armandia thaitina.

Vein iv_1 leaves the radius at the junction of the cross-vein. Vein iii_2 is well removed beyond the cell. In these characters *Armandia* attains the specialization of *Zerynthia*, but on secondaries the humeral cell is much extended. Vein iv_2 of secondaries is extended, forming a long and slightly spatulated "tail." The extension to vein v_1 is shorter, and that to v_2 is still more abbreviated. The internal vein reaches the anal angle, but it is curved as in the preceding genera, thus more specialized than *Sericinus*, in which it is straight. The long primaries and the tailed secondaries strongly remind one of the Papilionidæ. The pattern of ornamentation and the neuration are those of its group.

Mr. Scudder (*l. c.*, 121) spells the name of this butterfly "*thaidina*," but Staudinger (in litt.) gives the spelling which I have above adopted.

Sericinus telamon.

In this type the sexes differ greatly in color and markings. In the two specimens examined (det. Staudinger) it is, strange to say, the female which shows the more advanced type. But I infer that the differences noted are individual. In both, vein iv_1 leaves the cross-vein, a generalization as compared with *Armandia*, as is also the still larger humeral cell of the secondaries. But in the white male, vein iii_2 leaves the radius *before*, in the yellow, black-striped female just *after*, the point of jointure of the cross-vein. The internal vein on hind wings is straight, and this is a generalization as compared with all preceding generic types. The prolongation to vein iv_2 is very long and quite even in width, not spatulate. In this genus and *Armandia* the cubitus shows a slight scar, the relic of the vanished cross-vein.

So far as I am able to ascertain from accessible literature, I have here discussed the neuration of all the generic types yet proposed in the Parnassiidæ. It becomes quite clear, I hope, that the neuration assumes a more specialized type in the Parnassiidæ, as compared with the Papilionidæ, while retaining the essential feature characterizing the entire group. So far as I am aware, no contradiction exists to the view that, commencing our lists with the more specialized members of any group, we should in this case allow the Parnassiidæ to take precedence.

Fam. II. TEINOPALPIDÆ.

Specialization has carried this family, which consists of but a single type, entirely beyond the range of generic differentiation in the Papilionidæ. The neuration has submitted to changes similar to those characterizing the Parnassiidæ, changes of which I find no more than an indication in the Papilionidæ, so that in some respects it affords an intermediary type. The disintegration of the series of the median veins on primaries has progressed far beyond the present condition of any generic type in the Papilionidæ which I have been able to examine. Vein iv_1 has become radial, vein iv cubital, and the latter has abandoned its approximately central position and forms an unbroken curve with the cubitus. Thus the whole shape of the cell and cross-vein has undergone an important modification and the proper papilionid type of these parts has been abandoned. The cross-vein is much degenerate across the wider interspace which now intervenes between veins iv_1 and iv_2. The wing also recalls in its present condition that of *Charaxes*, except that iv_2 is cubital, while the long furcation of iii_4 and iii_5 accentuates the resemblance. The cubital cross-vein has practically vanished. There is a feeble notch on the lower edge of the cubitus and a clouding or thickening of the tegument as far as the submedian fold (vein vi). This submedian fold is always stronger at base, and, as we shall see in genera of Papilionidæ, the cubital cross-vein first disappears between it and vein vii, fading upwardly. The internal vein of hind wing is continued to anal angle and is straight. The "tail" to vein iv_2 is narrow and even (♀). Studying this type, it becomes clearer how the wing of the Papilionidæ may have given rise to the wing of the Parnassiidæ. It may be regarded as a lateral offshoot from the Papilionidæ.

With regard to the propriety of making *Teinopalpus* Hope a family type, there can be no question from the neuration, and when we add to this the peculiar structure of the mouth parts and body it should remove doubt. For, as I tried to show in 1883 (Papilio, 3, 36), it appears certain that our categories are quantitative. The quantity assigned to the Papilionidæ is here in all respects exceeded. Alone the shape of the wing, a "superficial" character, remains papilionid, but this is approached by some Parnassians and shared by other Lepidoptera. With regard to the name, it has been proposed by Felder to change it on account of

its hybrid character. It seems to me safer to keep the original term proposed by Hope, the discoverer of the insect, since this course avoids all philological discussion, with which zoölogists are not primarily concerned and perhaps not always competent to enter upon. It seems likely also that in the future *all* rules limiting the action of the law of priority upon the published name will of themselves fall from lack of authority, and that preoccupation will remain the only bar to the use of the original title.

Teinopalpus imperialis.

Radius five-branched, generalized; iii_3 at or just beyond the point of juncture of cross-vein; iii_4 and iii_5 a long furcation. Vein iv_1 radial, nearing radius; cross-vein between iv_1 and iv_2 inwardly curved, degenerate. Vein iv_2 distinctly cubital, continuous. Submedian fold (vein vi) indicated, strongly so at base; between the fold and cubitus obliquely placed and faint traces of the vanished cubital cross-vein. On secondaries humeral cell narrow, elongate; the marginal veins subequally strong, the upper slightly thicker, a Parnassian character. Cell entire on secondaries, vein iv_2 cubital. Internal vein straight, continued to anal angle.

Contrary to what has seemed to me elsewhere the almost general rule, the primaries appear here, as also in the Parnassiidæ, more specialized than the secondaries. The falcate fore wings, the sharp outlines, while imparting to this butterfly an artificial look, remind one of the Charaxinæ. The movement of the media in disintegration is Parnassian, while the presence of vein ix on primaries decides at once its position as a member of the Papilionides.

Stated Meeting, February 3, 1899.

Vice-President SELLERS in the Chair.

Present, 19 members.

A letter was read from the President announcing the appointment of the Standing Committees for 1899, as follows:

Finance.—Messrs. Philip C. Garrett, William V. McKean and Joel Cook.

Publication.—Messrs. Daniel G. Brinton, Henry C. Baird, Patterson DuBois, I. Minis Hays and Joseph Willcox.

Hall.—Messrs. Horace Jayne, Joseph M. Wilson and Harold Goodwin.

Library.—Messrs. George F. Barker, T. Hewson Bache, Samuel P. Sadtler, Albert H. Smyth and Joseph G. Rosengarten.

To fill vacancy on Michaux Committee, Prof. Joseph T. Rothrock.

Announcement was made of the death of Mr. J. Blodgett Britton, at Warrenton, Va., January 19, 1899.

Vice-President Sellers then delivered the Annual Address, his subject being "Electrical Transmission of Energy."

Prof. Keiser made a communication "On a Liquid Acetylene Diodide," which was discussed by Dr. Sellers.

The Society was adjourned by the presiding officer.

Stated Meeting, February 17, 1899.

Vice-President SELLERS in the Chair.

Present, 11 members.

Minutes of stated meeting held February 3 were read and approved.

The minutes of January 20 were amended to show that nominations 1488 and 1489 were then read for the first time.

Donations to the Library were announced.

A letter from Dr. Frazer was read, presenting the obituary notice of Prof. E. D. Cope, which was also read to the Society. Remarks on the same were made by Messrs. Sellers and Cleemann.

On motion of Dr. DaCosta, the thanks of the Society were voted to Dr. Frazer for the great care he has taken in the preparation of the obituary notice of Prof. Cope.

The Clerk of the Council reported that, no quorum being present on February 10, no business was transacted.

Dr. Hays offered a resolution that a Conversazione be given

by the Society at a date to be subsequently fixed, and that a Special Committee of seven members be appointed by the President to arrange for the same. Carried.

The Society was adjourned by the presiding officer.

Stated Meeting, March 3, 1899.

Vice-President SELLERS in the Chair.

Present, 15 members.

A letter was read from Dr. Cyrus Adler, on behalf of the American Committee of the Second International Conference on a Catalogue of Scientific Literature, requesting the Society to appoint a Committee to study the various questions relating to the Catalogue and to give its counsel on or before April 1, *proximo*. On motion, the President was authorized to appoint the Committee as requested, and he subsequently appointed Prof. Barker, Dr. T. H. Bache, Prof. Sadtler, Prof. Smyth, Mr. Rosengarten and Dr. Hays.

Prof. W. B. Scott presented for the *Transactions* a paper by the late Prof. Baur and Dr. Case, entitled "The History of the Pelycosauria, with a Description of the Genus Dimetrodon, Cope," which was discussed by Dr. Sellers and Messrs. Wistar and Morris, and was referred to the following special Committee: Prof. Scott, Dr. Jayne and Mr. Arthur E. Brown.

The Society was adjourned by the presiding officer.

Stated Meeting, March 17, 1899.

Vice-President Dr. SELLERS in the Chair.

Present, 23 members.

Mr. Henry S. Pancoast, a newly elected member, was presented to the Chair, and took his seat.

Correspondence was submitted as follows:

From Hon. John Hay, accepting membership in the Society.

From the President, announcing the appointment of the following Committee on the Scheme of Classification proposed by the International Conference on Scientific Literature, to wit, the Library Committee and the Librarian.

From Vice-President Sellers, announcing the appointment of the following Committee on the paper of Prof. Baur and Dr. Case: Prof. Scott, Dr. Jayne and Mr. Arthur E. Brown.

The Librarian presented a list of donations to the Library.

The report of the Committee on Prof. Seeliger's paper was presented and accepted, and it was ordered that the decision of the Society thereon be reported to Prof. Meyers by the Secretaries.

Prof. George F. Barker made a communication on Hertzian waves.

Pending nominations Nos. 1477, 1478, 1480 to 1487, 1489 to 1495 and new nominations Nos. 1496 and 1497 were then read.

The Society was adjourned by the presiding officer.

Stated Meeting, April 7, 1899.

Vice-President WISTAR in the Chair.

Present, 5 members.

The minutes of the stated meeting of March 17 were read and approved.

An invitation of the Imperial Academy of Sciences of St. Petersburg to attend the fiftieth anniversary of the establishment of the Central Physical Observatory, on April 1–13, was read.

On motion of Dr. Hays, the Secretaries were requested to acknowledge receipt of the same and express regret that the

time was too short to permit of sending a delegate to attend the anniversary.

The deaths of Prof. Othniel Charles Marsh, of New Haven, on March 18, in his sixty-eighth year; of Richard A. Tilghman, of Philadelphia, on March 24, in his seventy-fifth year, were announced.

On motion of Mr. Prime, Gen. I. J. Wistar was appointed to prepare an obituary notice of Mr. Tilghman.

A paper was read on "Specializations of the Lepidopterous Wing: The Parnassi-Papilionidæ, II," by A. Radcliffe Grote, A.M.

The Society was adjourned by the presiding officer.

SPECIALIZATIONS OF THE LEPIDOPTEROUS WING: THE PARNASSI-PAPILIONIDÆ.

II.

(Plates III, IV and V.)

BY A. RADCLIFFE GROTE, A.M.

(*Read April 7, 1899.*)

Fam. III. PAPILIONIDÆ.

The cubital cross-vein is always distinct, while in certain forms it does not connect inferiorly with vein vii, but is arrested at the submedian fold (vein vi). This latter is bent downwards to vein vii, beyond the cross-vein, in those types in which the cross-vein attains vein vii (see Comstock's figure in *Evolution and Taxonomy*, Plate ii, Fig. 2), and appears again within the cross-vein to base of wing. In certain forms the submedian fold is continuous from base to external margin, and the cross-vein then rests on this fold and does not reach vein vii (*e. g.*, *Eurycus cressida*, *Pathysa antiphates*, *Iphiclides podalirius*). The following table separates neurational groups, and, as far as possible, the genera. The hairy male pockets on the hind wing I have not specially examined. In the nomenclature of the veins I continue to follow Comstock.

1. Vein iii_3 of primaries out of iii_4 beyond the cell halfway to apex:
   2. Cell of hind wings disproportionately reduced:
      Hind wings greatly developed inferiorly, with long, pointed tail.....(1st Group) *Leptocircus.*
1. Vein iii_3 of primaries arises from radius more or less exactly opposite to the point of junction of discal cross-vein:
   2. Cell of hind wings subequal, narrowed outwardly by a downward curve of cross-vein between iii and iv_1:
      3. Vein iii_1 of primaries anastomoses with ii:
         Hind wings produced inferiorly, with short, sharp tail... (2d Group) *Idaides.*
         Hind wings produced inferiorly, terminating bluntly, without tail.....*Zetides.*
         Hind wings not produced inferiorly, rounded, tailless... *Arisbe.*
         Hind wings not produced inferiorly, with long, narrow, equal tail.....*Pathysa.*
   2. Cell of hind wings subequal, not narrowed outwardly (except in *Iphiclides*):
      3. Vein iii_1 of primaries free to costa:
         4. Internal vein of hind wings shorter, running out on internal margin before the longer excision at anal angle:
            Hind wings tailless.....(3d Group) *Eurycus.*
            Hind wings tailed.....*Pachlioptera.*
         4. Internal vein of hind wings longer, attaining the internal margin before the shorter excision at anal angle: (4th Group)

[*Papilio, Iphiclides, Jasoniades, Euphoeades, Heraclides, Laertias, Menelaides, Achillides, Orpheides, Nestorides, Calaides, Priamedes, Parides, Ithobalus, Iliades, Troilides,* with the types given by Scudder, I am unable to separate by adequate neurational or wing characters in a table. They all generally agree, most of them exactly except by relative characters so obscure as to be of hardly more than specific value.]

1. Vein iii_3 arises from radius above the cell and just before the junction of the cross-vein.....(5th Group) *Trogonoptera.*
1. Vein iii_3 arises from radius above the cell and well before the point of junction of discal cross-vein:

4. Internal vein of hind wings reaching to anal angle, internal margin full and rounded.....
(6th Group) *Ornithoptera.*

From the foregoing table we may extract the following neurational diagnoses of the principal genera in the different groups:

(1st Group.)

Gen. *Leptocircus* Swainson, 1832.

Type: L. curius.

= *Lamproptera* Gray, 1832 (preoccupied).

Vein iii_3 of primaries arises out of iii_4 beyond the cell halfway to apex of wing. Cell of hind wings disproportionately small and reduced. Hind wings greatly developed inferiorly, with long, pointed tail. On primaries the cubital cross-vein does not attain vein vii, but is arrested at submedian fold (vein vi). Vein "ix" of primaries present, as everywhere in the Papilionides.

The neuration of primaries, owing to the advanced position of vein iii_3, presents very striking analogies with the Sphingidæ, but a relationship with this group is absolutely excluded by the presence of vein "ix" and absence of viii on fore wings. An habitual resemblance to *Goniloba* and other Hesperian genera is offered by the coloration; this is perfectly contradicted by the neuration which is Papilionid. How great must be the phyletic value of vein "ix," if it persist in this isolated and aberrant form! In none of the generic types examined by me do I find any probable indications of the more immediate phylogeny of *Leptocircus.*

(2d Group.)

Gen. *Idaides* Hübner, 1816.

Type: I. codrus.

Vein iii_3 of primaries arises from the radius more or less exactly opposite the point of junction of the discal cross-vein. The discal cell of secondaries is subequal, but is narrowed outwardly by a downward curve of the cross-vein, between radius (iii) and first branch of media (iv_1). Vein iii_1 of primaries, the first radial branch, anastomoses with vein ii. The cubital cross-vein is degenerate, narrow, and does not reach vein vii. The hind wings are produced inferiorly, and vein iv_2 terminates in a short and sharp tail.

This term has priority for a well-defined group characterized by the junction of the first radial branch with the subcosta. It is also marked by the downward scoop of the cross-vein between veins iii and iv_1 on hind wings. The genera *Idaides* and *Zetides* are closely allied, and appear merely to differ by the details of specialization of the outer margin of secondaries. *Arisbe* stands further apart by the rounded, not produced, hinder margin of secondaries. It possibly represents an older form of the group. *Pathysa* differs by the frail, testaceous veins, as well as by the tailing of the normally proportioned hind wings. In all of these characters, as well as in the striped ornamentation, it recalls *Iphiclides*, belonging to a different group having vein iii_1 free to costa. A further character, and one which suggests that *Iphiclides* presents an intermediary type, is that this latter genus has also the cross-vein of secondaries downwardly curved, between radius and first branch of media on hind wings. The intersection of the radial branches with the subcosta, which characterizes this group, is paralleled in the Charaxinæ. Nevertheless, I think we cannot regard this common feature as indicating more than an analogy between the Nymphalids and Swallowtails.

(3d Group.)

Gen. *Eurycus* Boisduval, 1836.

Type: E. cressida.

Vein iii_3 of primaries arises from the radius at a point more or less exactly opposite that of the junction of the discal cross-vein. The discal cells are subequal on both wings. Vein iii_1 of primaries free to costa. Internal vein of hind wings shorter, running out on internal margin before the long excision at anal angle. On primaries the cubital cross-vein expires just before vein vii. Humeral cell of secondaries large, subquadrate. Hind wings subovate, without tail.

This group is interpolated in this place on account of the extreme specialization of internal margin of secondaries and the shortening of vein vii. Thus the same tendency is manifested here as in the Parnassiidæ, to hollow out the margin and shorten the anal vein of the hind wings. The group is probably a lateral specialized branch from early forms of the succeeding and more typical group of the family. The genus *Pachlioptera* Reakirt, 1864, with the type *aristolochiæ*, differs very slightly. I regret not to have been able to examine *Blakeia gundlachianus* (columbus, grotei).

(4th Group.)

Gen. *Papilio* Linné, 1758.

Type: P. machaon.

Vein iii_3 arises out of radius more or less exactly opposite to the point of junction with discal cross-vein. Cells subequal. Vein iii_1 of primaries free to costa. Internal vein of hind wings inwardly curved, attaining the margin just before the short excision at anal angle. Cubital cross-vein joins with vein vii.

Except *podalirius*, the types of the genera arranged under this rubric agree in main features, while differing in small details which it is optional to consider as of generic value. In *machaon* the humeral cell of hind wings is small and narrow. The præcostal spur has a lateral extension. There is a moderate, narrow tail, not spatulate.

(5th Group.)

Gen. *Trogonoptera* Ripp., 1890.

Type: T. brookeana.

Vein iii_3 arises just before the point of junction of cross-vein with radius. Cubital cross-vein not attaining vein vii. Fore wings long and narrow, pointed, entire. Hind wings reduced, rounded, tailless. Internal margin full, the vein straight, continuous. From the characters of the radius this genus is nearer to *Papilio* than to *Ornithoptera*. It is remarkable how persistent the neurational features are in the group of *Papilio*, and especially that vein iii_3 is so immovable in its position nearly exactly opposite the cross-vein. It must be therefore considered an important feature that this vein arises much beyond the cross-vein in *Leptocircus*, and before it in *Ornithoptera*. In *Trogonoptera brookeana* it has not quite attained the Papilionid position, but it has decidedly abandoned that of *Ornithoptera*. The structure of the hind wings resembles that of the latter genus.

(6th Group.)

Gen. *Ornithoptera* Boisduval, 1832.

Type: O. priamus.

Vein iii_3 arises out of radius above cell and well before the point of junction of cross-vein. Discal cells subequal. Vein iii_1 free to costa. Internal vein of hind wings reaching anal angle; no anal excision.

The comparative characters are those of generalization, so that *Ornithoptera* presents features which the rest of the Papilionides have probably abandoned. In the same way I assume that the species of *Eurymus* (*Colias* Auct.) have passed through a *Meganostoma* stage, and the entire extant Pieridæ an *Anthocharis* stage, in which latter the Radius was five-branched and generalized. There is a strangeness about *Ornithoptera*, suggesting a separate origin. This disappears with the higher forms of the Papilionides, which have come to look much like other butterflies. The remaining generic types may be now gone over in review. As far as possible I take the generic titles in their chronological order.

(2d Group.)

Zetides sarpedon.

Agrees with *Idaides*, except that the secondaries are bluntly produced inferiorly and are without a tail. Vein iv_2 lies somewhat nearer iv_3 at base. In both genera the excision at anal angle is long, owing to the produced wing, but vein vii is not relatively shorter, as in *Eurycus* (3d Group). *Zetides* appears more specialized than *Idaides*. The differences are small, but may be considered as of generic importance.

Arisbe similis.

Agrees with *Idaides*, except that the secondaries are not produced inferiorly; the outer margin is rounded, without salient projection. The anal excision is shorter. The position of iv_2 on secondaries is more central, and this appears a more generalized form than either *Idaides* or *Zetides*.

I am indebted to the kindness of Dr. Karl Jordan for material of this species. Notwithstanding the differences in shape of hind wings, these three genera are undoubtedly phylogenetically nearly related. The veins are opaque and strong.

Pathysa antiphates.

Agrees in one essential neurational feature, the fusion of the first radial branch, with the preceding genera, to which, notwithstanding "superficial" discrepancies, it may thus be distantly related. The cubital cross-vein is attenuate, and does not reach vein vii. On the secondaries the position of iv_2 is nearly central. Vein iv_3 is produced into a long tail, not spatulate. In shape of wing this genus resembles *Iphiclides*, as also in the slender, transparent

veins, and in the striped character of the ornamentation. It probably occupies an independent intermediate position. The colors in this group, brown and greenish yellow, are peculiar, and, in preparing the wings in the usual manner, they are persistent. *Pathysa* has striped wings. In *Arisbe* the bands are indicated by scattered blotches. These latter are gathered into a single series of interspaceal spots in *Idaides*, on the primaries. These spots coalesce and broaden into a band, which also obtains over the hind wings, in *Zetides*.

The coincident characters of *Pathysa* and *Iphiclides* allow of no other conclusion than that the two are somewhat nearly phylogenetically connected, notwithstanding the fact that in *Pathysa* the first branch of radius joins subcosta, while in *Iphiclides* it is free. Assuming that the Second Group contains younger forms, we might have in *Iphiclides* a type representing a stage through which *Pathysa* has already passed. But *Iphiclides* and the members of the Second Group are in one character more generalized than *Papilio* and its immediate allies, *i.e.*, the straight internal vein of hind wings. We have probably to do with divergencies from a common stock in different directions, in part retaining characters of generalization. It is sufficient here that we show that *Iphiclides* and *Papilio* constitute totally distinct genera, having probably a different immediate ancestry. And it remains a possibility that the fusion of the first radial branch with subcosta is a more recent feature, here engrafted upon a wing in other characters representing an older type than *Papilio*. Thus the *Idaides* group may be a lateral branch, thrown off before the tendency of the internal vein to curve and shorten on hind wings was developed. And to this branch, as represented by *Pathysa*, *Iphiclides podalirius* and allies may be related. In respect of the curved inner margin of the hind wings, *Papilio machaon* and allies are more specialized than *Iphiclides*.

(3d Group.)

Pachlioptera aristolochiæ.

The shape and neuration of primaries agree exactly with *Eurycus*, except that the cubital cross-vein, while narrowing inferiorly, appears to reach vein vii, forcing the submedian fold down to the vein. On secondaries the humeral cell is smaller and vein iv_3 terminates in a spatulate tail. Veins iv_2 and iv_3 are not so near at

base as in *Eurycus*, than which this form appears more generalized. I do not doubt the validity of the genus.

(4th Group.)

Iphiclides podalirius.

Compared with *Papilio machaon* the veins are more slender and transparent. Veins iv_2 and iv_3 on secondaries are nearer together at base. The internal nervure is straight and the margin fuller on hind wings. On primaries the cubital cross-vein is slighter and does not attain vein vii. The discal cross-vein is downwardly curved on hind wings between iii and iv_1. The humeral cell is larger than in *Papilio*.

By the free first radial branch this genus agrees with *Papilio* and the other genera of the group. Otherwise it is more nearly connected with *Pathysa antiphates*, and its generic distinction as compared with *Papilio* is beyond question. The straight internal vein of secondaries is a character of generalization as compared with *Papilio*.

Jasoniades turnus.

Agrees very closely with *Papilio*. The humeral cell is larger, the tail shorter and a little spatulate. The internal vein is curved, as in *Papilio*, with which it so closely corresponds as to make the propriety of its generic separation doubtful. The two forms appear to belong to the same immediate phylogenetic line.

Euphœades troilus.

The tail is a little shorter and spatulate; otherwise this form agrees so exactly with *Jasoniades* that I find no distinguishing character whatever. Belongs to the same branch and group.

Heraclides thoas.

The tail is a little longer than in *Jasoniades* and spatulate. Vein iv_2 on secondaries is a little farther from iv_3, so that *Heraclides* is more generalized. Otherwise I find no differences whatever. From *Euphœades* I find only the slightly longer tail to distinguish it.

The separation of the preceding forms, except *Iphiclides*, from each other and from *Papilio* seems difficult from the neuration. All have the internal vein of secondaries curved and are evidently very nearly related, belonging to the same phyletic branch of the family.

Laertias philenor.

Agrees with *Papilio* and preceding genera, except that the internal vein of secondaries is straighter and the margin fuller. I think this feature important. The tail is shorter and hardly spatulate. While otherwise resembling *Jasoniades*, the relative position of iv_2 is a little more removed from iv_3 at base. Appears a slightly more generalized type than any of the foregoing, and to represent a stage from which it is probable the preceding (except *Iphiclides*) have emerged.

Menalaides polytes.

Differs from *Laertias* only in that the tail is shorter and broader, somewhat spatulate.

Achillides paris.

Agrees with *Laertias* and *Menalaides*, except that the humeral cell narrows a little more outwardly. The tail is a little longer than in *Menalaides*, from which I cannot otherwise satisfactorily separate it. These three "genera" appear to be related by the straighter vein vii of secondaries.

Orpheides demoleus.

Appears nearest related to *Jasoniades*. It only differs by the absence of a tail, and in that the præcostal spur is continued, in an even curve, quite to the shoulder of the wing. The internal vein of hind wings is bent as in *Jasoniades* and allies, with which it should be apparently associated.

Nestorides gambrisius.

Not distinguishable structurally from *Orpheides demoleus*. The præcostal spur is equally continuous, and, although the proportions of the humeral cell are very slightly different, I am of opinion that no sufficient generic characters can be supplied by the neuration.

Calaides androgeus.

Agrees well with the preceding, but differs by the median and cubital branches of the hind wings forming sharp projections, of which that to iv_2 is, as usual, the longest. On primaries vein iii_2 yields very slightly to the tendency to be outwardly removed, and arises beyond the exact point of junction of cross-vein.

The following three generic types stand rather apart and by themselves. There is, except the straighter anal vein, nothing in

the neuration to contradict main features in the definition of *Papilio*. They appear, on the whole, to be somewhat generalized forms, from the usually straight internal vein of hind wings.

Priamides pompeius.

Primaries rounded at tips; outer margin even, medially hollowed out, so that the wing may be described as subfalcate. Cubital cross-vein continuous to vii. Secondaries with præcostal spur continued to the margin, humeral cell moderate, internal vein somewhat bent, no tail, outer margin regularly scalloped.

Ithobalus polydamus.

Agrees with *Priamides* in shape of primaries, outer margin a little scalloped. Secondaries with internal vein straight, outer margin as in *Priamides*. Præcostal vein shorter, not reaching margin.

Parides echelus.

Primaries pointed, with sharp tips; external margin even, nearly straight. Hind wings with the outer margin produced between iv_2 and v_2, scalloped, without prominent tail. Internal vein straight, or even a little bulging. Vein iii_1 arises a little beyond cross-vein, and herein is this form specialized.

The following type seems related to those immediately preceding:

Iliades memnon.

The fore wings are intermediate in shape between *Priamedes* and *Parides;* the apices are blunt, while the outer margin is nearly straight. The tailless hind wings have the outer margin very slightly scalloped. The venation generally agrees; the internal vein of secondaries is straight.

I have been unable to obtain material of the butterfly "*Troides helena* L.," which Scudder gives as the type of Hübner's genus *Troides*, Verz. 88, a generic name which has then apparently been wrongly used for the type *Ornithoptera priamus* L. Specimens of "*Papilio helenus*," received from Dr. Staudinger and examined by me, do not differ from *Menelaides polytes* in venation; the "tail" is merely a little longer.

The last type I have been able to examine is:

Troilides torquatus.

The neuration agrees in every detail with that of *Heraclides*

thoas, so that I cannot distinguish the two in any way, and I must suppose this generic title to be invalid.

In all these generic types of the *Papilio* group the third radial branch arises just opposite the point of junction of the discal cross-vein, with a tendency to remove beyond it. The progress of this branch along the radius, outwardly, may be apparently taken as an index of the specialization. In the Papilionides there is a general correspondence between the movement of this vein and the specializations of the abdominal field of the secondaries. The bending of the internal vein of hind wings is secondary in its nature, has been probably attained along divergent lines, and is a separate and well-marked feature in the specializations of the wings of the Papilionides.

The question as to the value of generic characters becomes simplified when we reflect that there is no criterion, save that of quantity, by which we can divide them from specific characters. For practical purposes it is well to break up such extensive genera as *Papilio*, and to do so we must take slighter variations as the basis of the division. It may be remembered that none of our categories could apparently exist except for "missing links," and our species thus appear as the momentary results of an average of arrested development, with wider or narrower breaks between them. This is one of the irrelevant generalities which it is well to bear in mind, in order to avoid insisting too categorically upon the absolute value of our divisions and terms.

The generic types above discussed appear to group as follows:

Iphiclides.	Papilio.	Lærtias.	Priamides.
	Jasoniades.	Menalaides.	Ithobalus.
	Euphœades.	Achillides.	Parides.
	Calaides.		Iliades.
	Heraclides.		
	= *Troilides*.		
	Orpheides.		
	Nestorides.		

Systematic Position of the Papilionides.

The argument as to the rank and position in the system of the Papilionides may be recapitulated here: All the generic types in the Parnassi-Papilionidæ that I have been able to examine have

vein "ix" of primaries well developed. This vein arises at base next to vii, runs outwardly and downwardly, in a more or less strongly given curve, to internal margin. I am inclined to regard this vein "ix" as the remnant of a longitudinal vein which has become shortened, in the same way as vii becomes shortened and bent on the hind wings of the Papilionides, and of which latter the stages between the long, straight vein and the shorter curved vein are extant. This vein "ix" is opposed in position to vein viii of the Hesperiades, which appears as a slender fork to vein vii at base and is more or less distinct in the Pieridæ, Limnadidæ, Heliconiidæ, Libytheidæ, Nemeobiidæ, Riodinidæ, Lycænidæ and Hesperiadæ. I have found traces of it in *Argynnis* and *Vanessa* among the Nymphalidæ proper, but no indication of it in the Agapetidæ. Where it is wanting in otherwise related forms I adopt the view that it has faded out. It has faded out, then, in *Morpho*, while the cubital cross-vein is persistent.

While vein "ix" appears to be a character of a primary nature, the hind wings of the Papilionides display two other features, which, since they recur in other butterflies or moths, may be considered as characters of convergence. These are the humeral cell and the single internal vein. The three neurational features of the Papilionides together are wanting in all other butterflies, but the single internal vein appears again in the Saturniades, the humeral cell in the Limnadidæ and Bombycides, while nowhere throughout the higher Lepidoptera, so far as I yet know, is the primary character of vein "ix" repeated. The ancestry of the Papilionides is not yet made out by the discovery of surviving forms.

It is impossible to leave the Papilionides in a classificatory position between the Blues and the Skippers, because such a position violates the integrity of the Lycænid-Hesperian branch. The diurnals, as a whole, are susceptible of a tripartite division upon the neurational characteristics. These three divisions are, severally: the Parnassi-Papilionidæ, the Pieri-Nymphalidæ, and the Lycæni-Hesperiadæ. The first of these is isolated by the presence of vein "ix," the last two have a common bond in the presence of vein viii of the fore wings. Therefore the value of the divisions is unequal, and the first outweighs either of the two latter. If the Hesperiades are, then, to be forced at any point to admit the Papilionides, that point might be selected between the Pieri-Nymphalid and Lycæni-Hesperid groups. But the principal

defense for such an interpolation would be the common survival of the cubital cross-vein, which the Parnassians have lost. This is distinct in the Papilionidæ, and more or less so in the Nymphalid group, in the Limnadidæ, Heliconiidæ and Morphidæ, these latter appearing to be otherwise specialized Satyrids.' Thus this survival is shown in groups primarily differing in the presence of "ix" or viii on fore wings. I conclude, then, it is here an independent survival in unrelated groups. Nothing can show more clearly the overstress that has been laid upon the generalized features of the Papilionid wing than the demonstration that this residual character is shared also by the brush-footed butterflies, with which Mr. Scudder would head the sequence of the diurnals. There appears to be nothing in the neuration to contradict the monophyllism of the brush-footed butterflies, unless we are prepared to assume that the Agapetidæ and Morphidæ have parted with vein "ix" and not with viii.

The forked anal vein (viii) of primaries is absent in the Satyrids, and this feature seems, outside of the sexual character of the swollen veins (traces of which I meet in certain of the Nymphalidæ proper) and the generalized radius, to distinguish these from the Pierids. But the character is repeated in other groups of the brush-footed butterflies, and it seems impossible to find positive neurational characters upon which the Pieri-Nymphalidæ might be divided. And only the general pattern or plan of the veining—*i. e.*, the more parallel neuration and equal spacing, the retention of the middle median branch in position, an indisposition in the veins to approach and furcate—distinguishes the wings of the Lycæni-Hesperiadæ from those of the Pieri-Nymphalidæ. The Blues show a radial specialization on a wing which is fundamentally Hesperian. This points to the fact that the Lycænidæ and Hesperiadæ are members of a common phylogenetic branch, however remote the point of divergence may lie. I assume that this branch joins the main stem of the Pieri-Nymphalid butterflies, because in the Charaxinæ I find an approach to the separated longitudinal veins of the Hesperiadæ, while vein viii of fore wings of the Whites and brush-footed butterflies is repeated in the Lycæni-Hesperid group. Whether future studies in ontogeny render a presumed connection of the Papilionides with the Nymphalids entertainable or not, we are equally warranted, from the opposed directions of the last anal vein of primaries, in classifying the diurnals as either Papilionides or Hesperiades.

I conclude, then, that no sufficient reason can be shown for interrupting the sequence of what has been called the Macrolepidoptera, which all alike possess vein viii, and that for a group of butterflies having, on the contrary, vein "ix," the proper place in the system is by themselves at the commencement of the series. It must be recollected that our phylogenies are largely suppositional, and that, practically, whatever their origin, the diurnals should be kept together in collections and catalogues. No gain in scientific accuracy is attained in discarding the general lines of the Fabrician sequence of 1787. The correspondences of the Papilionides do not lie with the Hesperiadæ, as urged by Mr. Scudder, but with the Pieri-Nymphalidæ: the suspension of the chrysalis with the Pierids, the neurational analogies with the Nymphalids. If these are acknowledged as affinities, not as analogies, then there is also no sufficient reason for changing what is practically the best sequence and which has the advantage of being long accepted. It is an innovation to place the Papilionides between the Blues and the Skippers, and one which I show to be destitute of reason, from the neuration as well as from a weighing of the value of other features which appear on the surface to justify such a conclusion (see my papers in *Natural Science* for January and February, '98). It must, then, appear to me that no greater mistake has as yet been made in classifying the butterflies than that which associates the Swallowtails with the Skippers. And this is the main part of my argument, that whatever relationship may be made out for the Papilionides with the other butterflies, the connection of the Blues and the Skippers should not be disturbed by the Swallowtails being thrust in between them.

An unwarranted use of the terms "superficial" and "structural" has been repeatedly made in lepidopterological writings, sometimes for the mere purpose of invidious comparison. The assumed antithesis, as between classes of external characters, is entirely illusory. Uncritical studies of the shape of the genital pieces, as of any other of the appendages, lead to common and unsatisfactory results. I conclude that a phylogenetic classification cannot be reached until primary and secondary features are distinguished and the characters indicating relationship separated from those of convergence.

The neurational characters of convergence which appear in certain Papilionides, and again in groups of the Nymphalids, may

be summed up as follows: The first radial branch may intersect with subcosta (*Idaides* and *Anæa*); the cubital cross-vein or its traces occurs in both series (in the Nymphalids in *Limnas*, *Heliconius*, *Morpho*), while traces of the humeral cell of secondaries of the Papilionides are found in the Limnadidæ and Heliconiidæ. It is remarkable that just in these two latter families the resemblance is contradicted by the fact that both display the forked vein viii, in contradistinction to the downwardly curved vein "ix" of the Papilionides. It is this fact that allows me to consider the characters of resemblance as residual and common to the lepidopterous wing, and as undecisive of questions of a nearer relationship. These characters, the traces of the cubital cross-vein, etc., allow of the view that the Limnadidæ and Heliconiidæ retain primitive features and may more nearly represent early stages of the Nymphalids proper. Genera like *Dione* may supply a connection between the Heliconians and *Argynninæ* and render the view probable that the brush-footed butterflies are monophyletic.

Variability in the Veining.

I have shown (*Trans. Ent. Soc. Lond.* 1897, 342) that the variations in the neuration within the limits of a species take the same direction with those used to define distinct species or genera. In other words, they follow the chief directions which underlie most changes in the neuration. These latter lie in the breaking up of the median series and the suppression of the radial branches. For instance, in the five-branched forms of the Anthocharini there will be found a tendency to discard one vein in the direction of the four-branched forms of *Tetracharis*. In a variable species standing between *Euchlœ* and *Tetracharis* the disappearing vein may be discarded by anticipation (specialization) or retained by reversion (generalization). In *Pontia* we have the three-branched form definitely assumed, and we may consider that the ancestry of *P. daplidice* has passed through the *Euchlœ* and *Tetracharis* stages. In the same way the passage of *Mancipium* to a three-branched form is in process of accomplishment; sufficient material has not yet been examined of *brassicæ* to determine whether the short apical veinlet is discarded or not in the majority of individuals. In the *Zerynthianæ* we find individual variation in the direction of the breaking up of the median series; sometimes vein iv_1 ascends the radius; again, in generalized individuals, it retains its older position

on the cross-vein. It is a mistaken view to consider these variations "abnormal." They have a definite end and object, and show us how the changes in the venation have been slowly attained. All the species we take cognizance of are seemingly in a certain stage of progression, which temporarily assumes an apparent greater or lesser stability as the insect and its environment are equalized. In *Crinopteryx familiella* Spuler considers that we have a now variable form in the final stages of discarding the many-branched radius of the secondaries, thus showing us how the wing of *Eriocephalus* may have passed into that of the aculeate *Tineidæ*.

Conclusion.

I have taken the present opportunity to review my publications upon the neuration of the diurnals, to compare the figures again with the photographs and preparations. After supplying the missing details in the figures of *Parnassius apollo* (in which the lower incomplete margin of the humeral cell was omitted) and of *Heliconius antiochus* (in which the traces of the cubital cross-vein and internal vein were left out), I find nothing to add or alter. The method employed by me prevents errors of commission, but, owing to defects in the preparations, overlooked at the time, it has happened that the above details were not reproduced on the stone.

My studies were entered upon with the view of bringing our classifications into a nearer correspondence with a probable phylogeny. It was unexpected that the result was to confirm the general sequence of Linné and Fabricius, no less than that of the modern authors, Wallace, W. H. Edwards, the Catalogue of Staudinger, at least so far that we may commence with the Papilionides. Since the Parnassians belong beyond question to this stem, and are more specialized than the Swallowtails proper, we should begin with this family. I may reply to comparisons that have been made, that no results obtained in this way, as between ultimate specializations of the same organ in different groups of butterflies, can affect the phylogeny brought out by me. For this latter rests on the primary character offered by vein "ix," and not upon coincidences in ultimate structure, which are not exclusive, and may well have been independently reproduced upon separate phylogenetic lines. These are characters of convergence, and are not properly used as an index to relationship.

A review of the general neuration shows that the hesperid wing

is the simplest existent form with the veins all separate. A movement in specialization of the radial branches, normal with the lepidoptera, changes this wing into that of the lycænids. Both are now specialized and hardened types, and the position of the median branches has become so fixed that, in their specialization, the middle branch will not yield and submits to extirpation *in situ*. The condition of the hesperid wing is nearly reproduced in *Charaxes*, and proves that this was the original condition also of the Pieri-Nymphalid branch. It has been abandoned in specialization through the process of absorption and furcation of the veins; thus the hesperid type of wing becomes the unit underlying all the wing types of the Hesperiades. Into this group, so closed, and having the internal vein (vii) forked at base (viii), we can nowhere properly interpolate a group possessing an additional vein ("ix") and having no fork (viii) to the internal vein (vii), although, as a matter of theory, we may contend that the papilionid wing had also primarily separated veins.

I conceive, then, the Hesperiades to be monophyletic, a development of a single branch or stem of the lepidopterous tree, and as being independent of the Papilionides and their ancestry. As compared to the Papilionides, the rest of the butterflies are in the position of the Noctuid branch when compared with the Saturniades. This parallel is not a little exact. The development in evolutionary changes of the Papilionid wing is closely copied by the Saturniadæ, which have but one anal vein on hind wings. We have the same hollowing out of the inner margin in both groups among specialized forms. The Hesperiades resemble generalized moths in having two or more internal veins, and although these are convergent characters, not of phyletic value, they sustain the parallel. The exclusiveness of the Papilionides is supported by vein "ix" of primaries. When we take into account their total wing-structure, the idea that we have to do with a radically different development of the lepidopterous type becomes more and more reasonable. I separate, therefore, not the Hesperiadæ, but the Papilionides from the rest of the butterflies, and herein I differ from other authors, no less than from Comstock.

The general inequalities of all the specializations preclude, to a great extent, the question of rank, which practically becomes a matter of more limited importance within the confines of a single group. And I may repeat here, that the specializations of the

larvæ are neither homologous nor dependent upon the specializations of the imago. The external influences by which the different stages are surrounded are radically diverse. It is demonstrable that in *Apatela* the larvæ are more specialized, as larvæ, than are the moths, as moths. These latter are simple Agrotids, or Hadenids. The larvæ rank with the Arctians in specialization. Generic differences between imagos are not necessarily shown *also*, but may be displayed independently in the earlier stages of the insect. A specialized chrysalis may be attained by a form which, in the imago state, lags behind its fellows. I ventured first to give this view of the independence in specialization of the stages as early as 1876. Mr. Butler's paper on *Apatela* remains, at least, an exquisite satire on a generic classification from larval characters alone.

However, I seem to differ from Mr. Scudder (*Hist. Sketch*, 103), who holds that generic distinctions are as easily traced in the larva as in the imago, thus assuming a parity in specialization. Nevertheless, in the case of the forms of *Agrotis* Led., we may have moths which offer characters upon which generic distinctions have been founded, while the larvæ are so much alike that no such characters appear with them. And again we find species of *Apatela*, feebly differentiated in the imago state, proceeding from strongly diverging larvæ. The whole group of Acronyctid genera is held together by specializations of the larva alone. No intimate characters hold *Panthea* and *Apatela* united as moths, and here it seems possible that the larval specializations common to both are non-phyletic, convergent, they have been acquired along different routes, and thus the basis of the family Apatelidæ would be artificial. Where no such contradiction is offered the development may be assumed as monophyletic, the classification as natural. This view does not militate against the validity of Dyar's general classification as based on the larval tubercles in position. This character, as pointed out by me in '97, is valuable from its indifference to external influences.

In the case of the Papilionides there appears to be the alternative that either vein "ix" has developed subsequently to the disappearance of viii or before its appearance. If we accept the latter, then the Papilionides have branched off, as Prof. Comstock says, long before butterflies assumed their present form (*Evolution and Taxonomy*, 112). In this case all traces of an immediate ancestry

have, however, vanished. No concession to this fact is made by placing the Papilionides, as Prof. Comstock does, between the Blues and Skippers, clearly, even if distantly, related groups, offering at least no such contradictory characters as do the Swallowtails. Prof. Comstock in his able treatise, to which I am much indebted, does not entertain the view that the Papilionides may *not* have branched off from the immediate stem of the other butterflies, nor does he apparently insist upon the morphological value of vein "ix."

The diphylism of the diurnals is founded by me on the following characters:

A. Butterflies having a short anal vein on primaries, running from base to internal margin; on secondaries only one internal vein.....PAPILIONIDES.

B. Butterflies wanting the anal vein on primaries, instead vein vii is forked at base (viii), this fork sometimes wanting through degeneration, and having more than one internal vein on secondaries.....HESPERIADES.

All the Hesperiades examined by me have two internal veins to the hind wings, except *Pseudopontia*, which has three. This peculiar butterfly has the radius strongly specialized, and the retention of the third internal vein may have been necessitated by the circular shape of the wings. Theoretically it may be considered that all the diurnals possessed primitively three internal veins, in addition to the fold (vi), of which the Hesperiades, with the exception above noted, have parted with one, the Papilionides with two veins. In this particular the latter group are more specialized than all the other butterflies. The Saturniadæ, among the higher moths, have reached the same grade of specialization in this particular with the Papilionides. A diminution in the number of internal veins characterizes also certain of the more specialized groups of the Bombycides. The monotypic character of the Papilionides is evinced by the possession of vein "ix" of primaries, in which they appear to differ from all other butterflies, not by the number of internal veins, or by any other characters which they can be shown to share with other lepidoptera. Throughout my writings I have tried to show the direction of the evolution taken by the neuration, and I have accounted for the principal changes in position of the veins by their following these directions in spe-

cialization. The branches do not move backwards and forwards, but always tend to remove outwardly. None of these movements affect vein "ix." This remains stationary in the Papilionides, undisturbed by the changes in the radial branches, or of those marking the breaking up of the "median" system of the wing, as designated by Comstock.

For it does not affect the conclusions I have reached whether Comstock's nomenclature be ultimately adopted or not, while I favor its adoption. Whether the costal thickening be homologous with the veins, whether what I have called vein ii should not be rather called after Haase and Spuler vein i, or even whether Comstock's "radius" should be called the subcostal—and the "media," the radius—all these are questions of names and homologies with which my results are not primarily concerned. Whatever names are adopted, I believe to have shown that specializations are evidenced by the absorption of the veins, by the reduction of the radial (Comstock) branches and their progression along the main vein, by the opening of the discal cell and the fusion of the branches of the media (Comstock) with the radial or cubital systems of the wing. And whether we call the last, downwardly curved vein of the primaries of the Papilionides "anal," "internal," or "submedian," or number it, does in no way affect the argument, deducible from its presence, that the group possessing it occupies an exclusive position. I have further relieved the Papilionides from the vague charge of generalization, by showing that their residual characters are shared by the brush-footed butterflies, and that in the presence of but one internal vein to the secondaries they possess a character of specialization raising them above all the rest. Not the Swallowtails, but the Blues, are, from the neuration, the allies of the Skippers, and, having thus endeavored to divorce the Papilionides from their enforced association with the Hesperiadæ, I conclude that their fittest place is "at the head" of our linear systems and collections.

Finally (*Natural Science*, Feb., '98) I have ventured to suggest that certain changes in color run, in a general way, parallel with the specializations of the neuration. The white pigment colors appear to mark advanced forms. This is illustrated, in the Papilionides, by the fact that the Parnassiidæ, as a whole more specialized than the Papilionidæ, are also paler, more white in general hue. The most generalized group of the latter, *Ornithoptera*, contains species of the darkest, most intense coloration.

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CORRIGENDA.

To paper on the *Specializations of the Lepidopterous Wing: the Pieri-Nymphalidæ*, in these PROCEEDINGS, Vol. xxxvii, No. 157.

Page 23, line 6 from foot of page, *for* "Ager" *read* "Ageronians."

Page 24, line 25, *dele* the sentence commencing, "No trace of vein viii," etc.

Page 30, line 12 from foot of page, *insert* the words "a strong" before the words "vein viii of primaries."

Page 41, line 10 from foot of page, *for* "is" *read* "has."

Page 42, in the explanation of Plate I, Fig. 3 should refer to *Euchlœ cardamines*, Fig. 4 to *Anthocharis ausonides*. The numbers 3 and 4 are transposed on the plate.

Explanation of Plate III.

The figures are obtained by an improved photographic process. The veins are numbered according to the system Redtenbacher-Comstock: iii = radius, iv = media, v = cubitus. Vein "ix" of primaries, a principal character of the Papilionides, is numbered in red. The figures are of the natural size.

Fig. 1. *Parnassius apollo.*—Type of genus and family. The specialized form of the Papilionides, as shown by the following characters: On fore wings the first median branch (iv_1) has left cross-vein and arises from radius; the radius itself is four, instead of being five-branched; the cubital cross-vein has disappeared; on hind wings the lower margin of humeral cell has faded out superiorly, the internal margin is hollowed out, and vein vii is greatly shortened. *Doritis mnemosyne* does not differ generically from this type. *Hypermnestra helios* agrees by the four-branched, specialized radius, and I limit the subfamily to these two genera, since here the demarcation is abrupt, not, as in the Pierinæ, undefined.

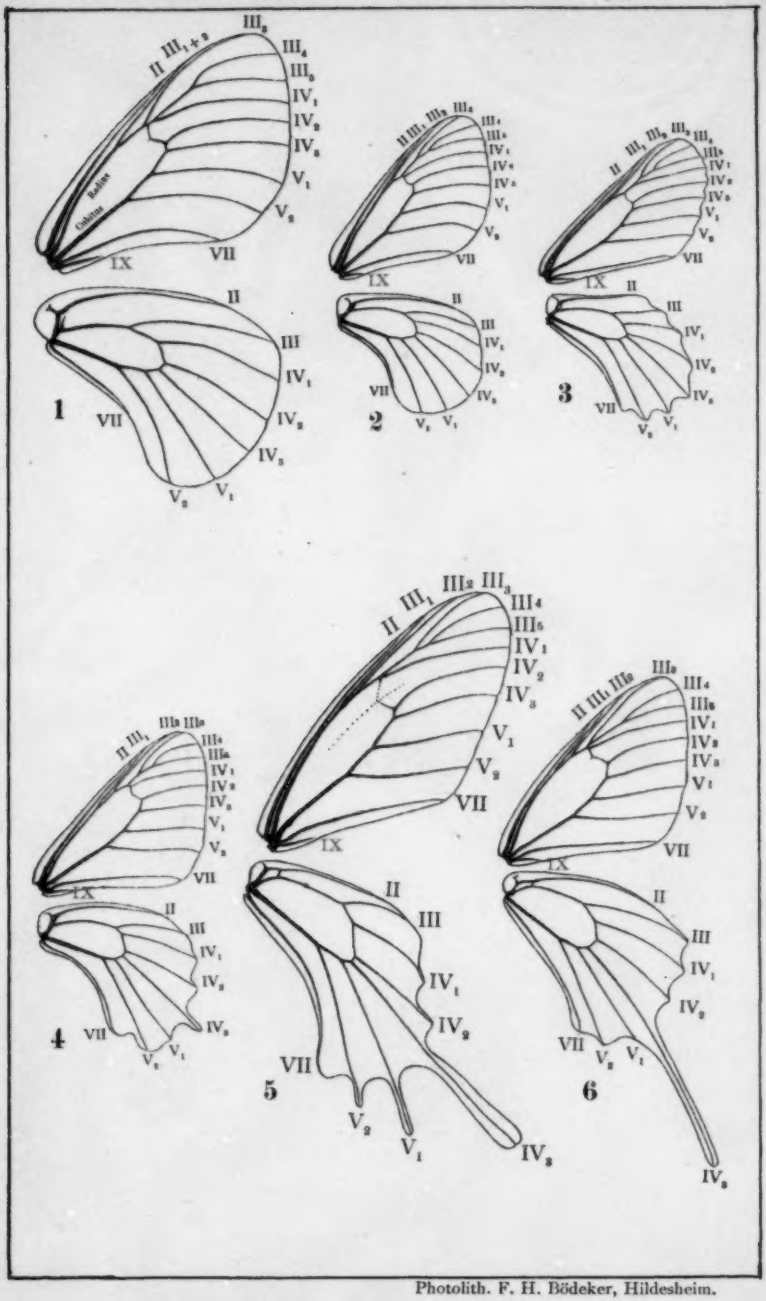
Fig. 2. *Archon apollinus.*—Type of genus and belonging to the subfamily Zerynthianæ, of which it is the specialized form. Radius five-branched, generalized. The first median branch springs from cross-vein; lower margin of humeral cell complete; vein vii longer, as compared with *Parnassius*. The ornamental bands have not been broken up into the spots of *Parnassius*. The white color of the Parnassians and Pierids has been developed independently and is here a general character of convergence. *Archon* is seen to be a generalized form when compared with *Parnassius*.

Fig. 3. *Zerynthia polyxena.*—Type of genus and subfamily. Radius five-branched. In this species and its varieties vein iv_1, the first median branch, is in a fluid state, sometimes issuing from cross-vein, sometimes ascending radius. Compare figure of *Zerynthia rumina*, Schm. von Hildesheim, Taf. i, Fig. 2. Vein vii of hind wings is but little shortened.

Fig. 4. *Luehdorfia puziloi.*—Type of genus. Agrees well with *Zerynthia*. In both this and *Armandia* the cubitus shows a very inconspicuous scar, a relic of the vanished cubital cross-vein. The gradual disappearance of this cross-vein, from the Papilionidæ to the Parnassiidæ, demonstrates the greater specialization of the latter. Compare text.

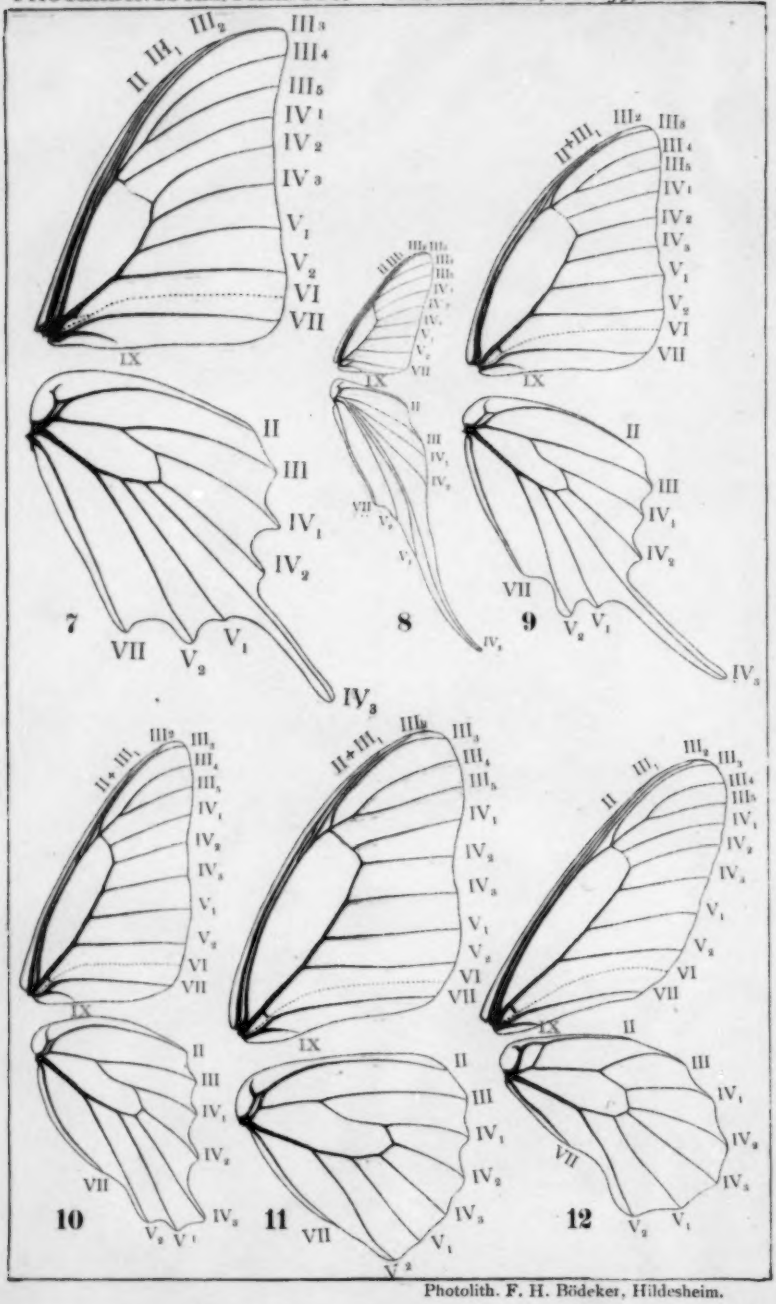
Fig. 5. *Armandia thaitina.*—Belongs to Zerynthianæ. Type of genus. Radius five-branched; iv_1 from upper corner of cell. A beautiful and interesting form, owing to the papilionid shape of wings.

Fig. 6. *Sericinus telamon* ♀.—Type of genus. Radius five-branched. First median branch (iv_1) from cross-vein, and herein more generalized than *Armandia*. Vein vii of hind wings hardly shortened. Compare these Parnassian types with the ensuing Papilionidæ. Note the equal presence of vein "ix" of primary wings and the survival of but one anal vein (vii) on hind wings, and that the two types mainly differ in the breaking up of the median system in the Parnassians. It seems probable that, in extinct types of Papilionides, the vein "ix" was lengthened and sought the anal angle of the primary wing.



Photolith. F. H. Bödeker, Hildesheim.

A. Radcliffe Grote — Wings of Butterflies.



Photolith. F. H. Bödeker, Hildesheim.

A. Radcliffe Grote — Wings of Butterflies.

Explanation of Plate IV.

The figures are obtained by an improved photographic process. The veins are numbered according to the system Redtenbacher-Comstock: iii = radius, iv = media, v = cubitus. Vein "ix" of primaries, the principal character of the Papilionides, is numbered in red. The figures are of the natural size.

Fig. 7. *Teinopalpus imperialis* ♂.—Type of genus and family. The neuration is specialized, as compared with the Papilionidæ. The cubital cross-vein is represented only by a residual mark. An intermediate type, with the breaking up of media on primaries taking the Parnassian direction, but an isolated offshoot from the Papilionid stem.

Fig. 8. *Leptocircus curius.*—Type of genus. A specialized form of Papilionidæ with the hind wing inferiorly enormously developed and the cell reduced.

Fig. 9. *Pathysa antiphates.*—Type of genus. On hind wing the discocellular cross-vein is downwardly bent between ii and iii. *Iphiclides* agrees with this type, except that the first radial branch is free. In *Pathysa* the first radial branch fuses with subcosta. Eimer, in his work, does not regard the neurational features of *Pathysa*.

Fig. 10. *Zetides sarpedon.*—Type of genus. Agrees in certain structural neurational points with *Pathysa*, differing by the inferior development and absence of "tails" and by the shorter anal vein of hind wings. This group is specialized by the inferior discontinuance of cubital cross-vein.

Fig. 11. *Arisbe similis.*—Type of genus. Agrees with *Zetides* in structural points, differing by the rounded hind wings. Compare text.

Fig. 12. *Eurycus cressida.*—Type of genus. Specialization is shown by the shortening of vein vii of hind wings and by the inferior degeneration of cubital cross-vein. *Eurycus* and *Pachlioptera* are interesting from the way they reproduce, upon a different type of wing, the specialization of the abdominal margin of the secondaries of *Parnassius*, a character of convergence, by which the margin becomes inwardly curved and the internal vein shortened. This direction crops out, among otherwise distinct forms, throughout the Papilionides. Again, as a character of convergence we meet it in the Saturniades (Grote, *Beitrag zur Class. aer Schm.*, S. 198, Fig. 1, *Callosamia*; S. 204, Fig. 9, *Rothschildia*; S. 206, Fig. 11, *Samia*).

Explanation of Plate V.

The figures are obtained by an improved photographic process. The veins are numbered according to the system Redtenbacher-Comstock: iii = radius, iv = media, v = cubitus. Vein "ix" of primaries, the principal character of the Papilionides, is numbered in red. The figures are of natural size, except Fig. 15, which is reduced one-half.

Fig. 13. *Iphiclides podalirius.*—Type of genus, to be compared with figure of *Pathysa antiphates.* Cubital cross-vein degenerates inferiorly. Between ii and iii of hind wings the discocellular is downwardly bent, as in the *Idaides* group. Radial branches free to costa, a character which brings this genus into the typical group of *Papilio*, with vein iii_3, the third radial branch, opposite cross-vein. Thus the genus is partly intermediate and appears, on the whole, nearer allied to *Idaides*, or rather to *Pathysa*, than to *Papilio.*

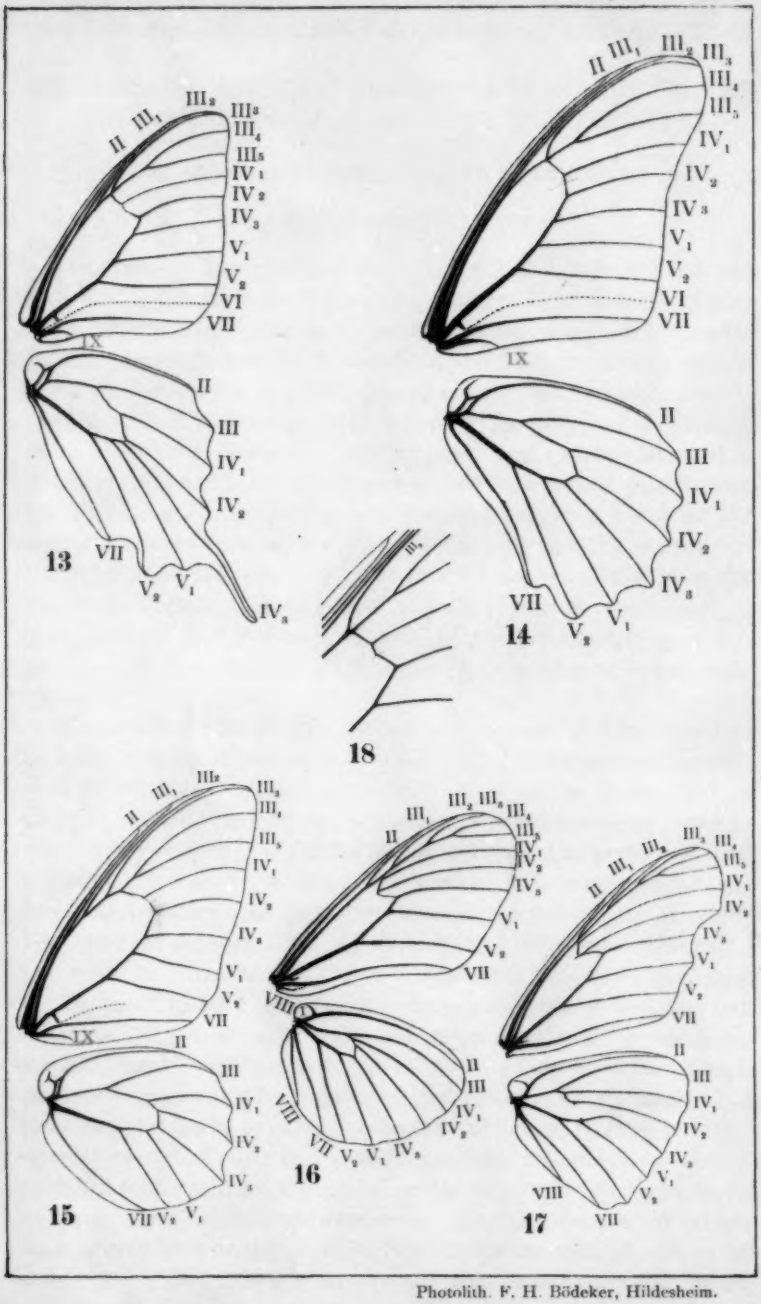
Fig. 14. *Priamides pompeius.*—Type of genus and belonging to typical group of *Papilio.* Compare text. [*Drurya antimachus*, mimetic of *Acræa*, not examined; probably belongs to the *Papilio* group as a specialized form.]

Fig. 15. *Ornithoptera priamus* ♂.—Type of genus. Note position of the third radial branch, which is thrown off before cross-vein. The furcation of iii_4 and iii_5 is long, so that the primitive condition which I assume, in which the longitudinal veins were all separate, is nearly attained. The total evidence is that *Ornithoptera* retains characters of the primitive form of the Papilionides. Compare wing with that of *Charaxes*, Schm. Hild., Taf. iii, Fig. 17, and Stein d. Weis., x, 282.

Fig. 16. *Heliconius antiochus.*—Type of genus and family. Belongs to the Hesperiades. Reproduced here to correct omissions in former figure; consult text. A more generalized form than the succeeding. Vein viii of fore wings partially degenerate; compare with figures of *Limnas* and *Libythea* in this respect, Proc. Am. Phil. Soc., xxxvii, Pl. iii.

Fig. 17. *Dione iuno.*—Generic type. Vein viii of primaries lost, but traces of cubital cross-vein retained. Belongs apparently to the Nymphalidæ. Consult figure of type in Proc. Am. Phil. Soc., xxxvii, Pl. ii. The open cell and condition of cross-vein on secondaries evidence the grade of specialization. Note that these figures of Hesperiades have two anal veins on hind wings, in contrast with the single vein of the Papilionides.

Fig. 18. *Tragonoptera brookeana.*—Section of ♂ primary wing, showing point of origin of third radial branch just before cross-vein. The position of *Papilio* has not been quite attained, while that of *Ornithoptera* has been abandoned.



Photolith. F. H. Bödeker, Hildesheim.

A. Radcliffe Grote — Wings of Butterflies.

CHAIRMAN'S ANNUAL DISCOURSE FOR 1899, ON THE TRANSMISSION OF ENERGY BY ELECTRICITY.

BY COLEMAN SELLERS, E.D., VICE-PRESIDENT.

(*Read February 3, 1899.*)

Gentlemen:—According to the old Rules of Administration and Order of the American Philosophical Society held in Philadelphia for the Promotion of Useful Knowledge, it was specified that some time during each year the President of the Society was expected to "deliver a discourse on some literary or scientific subject, accompanied by such suggestions with regard to the affairs of the Society as he shall judge proper." By the new rules, recently adopted, a date has been fixed for this discourse, with the further proviso that the President be authorized at his option to appoint one of the Vice-Presidents to take his place in carrying out the purpose of the rule. On January 14 of this year I received notice from our respected President that he had appointed me to this duty. I have selected as the subject of my discourse "Electricity as Applied to the Transmission of *Energy*," for a reason to be presently explained.

When the late Dr. William Pepper was elected a Vice-President he made much personal effort to excite an interest among the resident members in a scheme of quarterly meetings to be devoted to subjects of acknowledged importance, at which meetings a paper or papers on a subject selected for discussion should be presented, and a further effort made to insure the presence of, or correspondence from, all members who had given thought to the subject selected. He called on me soon after his election to induce me to prepare a paper on the transmission of *power* by electricity, or if I preferred not to do so, to have me suggest some one capable of carrying out the idea. At that time, about two years ago, he expressed some surprise that I should consider the subject-matter not yet far enough advanced practically for intelligent presentation or discussion. I promised, however, to correspond with my personal friends interested in electrical work to secure, if possible, contributions of importance that would be acceptable under the traditional requisites of matter fitted for our PROCEEDINGS or our *Transactions*. What has been or will be accomplished in this direction remains yet to be seen. Since that time the Society has seen fit to honor with mem-

bership many men of distinction in electrical engineering in its broadest sense. From some of these we may expect contributions.

Inasmuch as the founder of this Society, Dr. Benjamin Franklin, attracted attention as a scientist in the domain of natural philosophy by and through his electrical experiments, I think it advisable to call attention to the limited resources at his command, not only when he announced his belief that electricity and lightning were one and the same thing, but even up to the date of his death. I do so mainly to show the close interdependence between scientific research and the practical application of knowledge to the use of man, and further to show how much of the progress in exact scientific knowledge has been gained from the practical work done in experimental research by those who have not had the technical training or the knowledge of the higher mathematics, whereby they would have been able, to the extent of previously collected data, to formulate conditions leading to results in advance of the experimentation that alone can be depended on to prove the correctness of their deductions. I also desire to show how the growing wants of man have excited research, more particularly when commercial demand calls for the practical application of knowledge to any stated end.

Dr. Franklin was an experimenter. His interest in electricity as one of the then little understood but most interesting branches of natural philosophy was brought about through his ability to generate what he called "electric fire," and to exhibit the effects produced thereby, in conducting the simple experiments possible with the meagre apparatus at his command. It seems that he had received from a friend in London a glass cylinder or rod,[1] with which simple device, held in one hand and excited to produce electricity by being rubbed with a silken cloth, or the fur side of a catskin, he was able to charge Leyden jars or electric condensers, and thus exhibit the more striking effects of static electricity. The electric sparks from the outset may have impressed him as similar to the lightning flash of "thunder-storms."

In the order of chronological sequence, permit me to call attention to our records to connect this Society with his work. We know that Dr. Franklin, on April 5, 1744, eight years before his important electrical discovery, wrote to Mr. Colden explaining his idea of a Society for the Promotion of Useful Knowledge, which

[1] This rod, in its tin case, is in the collection of the Society.

was the beginning of the American Philosophical Society. Some time between 1747 and 1750 Mr. Philip Syng[1] is credited with designing a glass globe electrical machine.[2] One of these electrical machines, in perfect order, said to have been the one Franklin made the most use of, is among the highly prized relics owned by the Franklin Institute in this city. All of us who have used electrical apparatus can appreciate the value of Mr. Syng's invention and the help it afforded to Franklin in his experiments. Franklin was, like Prof. Michael Faraday, an experimenter. Neither of these two great men possessed the mathematical habit of thought that distinguished so many philosophers before and since their time; both based all their knowledge on succcessful experiments.

In 1752 Franklin wrote to his friend in London, Mr. Collinson, expressing his grounds for belief in the identity of electricity and lightning. It matters but little now that this important letter was not deemed worth publishing in the *Transactions* of the Royal Society. Soon after it was received, however, Dr. Fothergill suggested its separate publication. Franklin's discovery thus reached and deeply interested Count de Buffon. It was translated into French, and was read by most learned men of the day. This remarkable and extensive recognition of the discovery induced the Royal Society in 1753, one year later, to make Dr. Franklin a member, without waiting for any formal application in the usual course, and without the payment of any fee or dues as a member. He was also honored the same year with the Copley gold medal for his discovery. Sir Humphrey Davy wrote of Dr. Franklin, in reference to his work, that "a singular facility of induction guided all his researches, and by very simple means he established very great truths. The style and manner of his publications are almost as worthy of admiration as the doctrines they contain. . . . . He has written equally for the uninitiated and for the philosopher."

Franklin's discovery, whether made by means of a kite in Philadelphia or by lightning rods in France, was turned to important use by his suggested protection of buildings from the effects of lightning, from "thunderbolts," or from the so-called electric fire of the clouds.

[1] Mr. Philip S. P. Conner says that Philip Syng in Franklin's time was a goldsmith.

[2] One such globe, mounted on an axle and provided with a driving pulley, was exhibited, belonging to the cabinet of the Society.

This practical application of his discovery, taken in connection with his improvements in fireplaces, his invention, given freely to the world, of the so-called Franklin stove, and other useful inventions, are proofs of his attention to the question of practical and useful results as the outcome of his philosophical studies based on experiments. To more fully understand the limited knowledge possessed in Franklin's day, even up to his departure from life in 1790, it should be borne in mind that not until 1774, when Dr. Joseph Priestley discovered oxygen, was the chemistry of to-day possible. Priestley's discovery took atmospheric air out of the list of simple elements, and was the beginning of the rapid advance in our knowledge of chemistry. Electricity also had no acknowledged connection during Franklin's lifetime with magnetism. Aloisio Galvani had noted an effect of electricity on animals (in fact, what is now known as galvanic action) in 1780, but what is of more importance to bear in mind, in connection with the limited knowledge possessed by physicists in Franklin's time, is the invention of the voltaic pile (which was the beginning of all galvanic batteries since used), was not perfected by Alexander Volta until 1800; therefore, Galvani's and Volta's discoveries had no place in Franklin's studies.

The American Philosophical Society has among its collection some interesting pieces of apparatus of Franklin's time, but, as bearing upon this brief outline of Dr. Franklin's contribution to our knowledge of electricity, a suggestion has been made by Dr. George F. Barker, that the American Philosophical Society shall in the near future examine into the authenticity of all the apparatus held as souvenirs in America by individuals and societies which are claimed to have been used by the founder of this Society. I must also call your attention to the claim that has been made to the effect that to Dr. Franklin and Count Rumford (Benjamin Thompson), both Americans by birth, "we owe the first important step toward a full appreciation of the co-relation of forces and the conservation of energy." The limited acceptance as true of this important fundamental law of nature, based on the assumption that there is only a given amount of energy available in nature for man's use, and that no effort of human intelligence can add to or increase the amount of such energy at our disposal, is shown by the ready credence given even at this late day to the claims of inventors of perpetual-motion machines, or the ready ear lent to charlatans who, by means of verbose pseudo-scientific jargon and fraudulent exhibitions

in support, claim the discovery of some new and heretofore unrecognized power that is to supersede all known forms of energy utilized in the modern means for actuating machinery.

With the first conception of the electric telegraph electricity generated by galvanic batteries was used. The energy of the galvanic battery was transmitted to instruments which produced motion and thus made visible impression upon paper, or later by sound, to convey intelligence through the equivalent of dots and dashes, or by sight noting the vibration of a needle, all of which motions involved the transmission of power, no matter how little might be required for the purpose.

When electricity came to be transmitted for lighting purposes it was not in the form of what was generally accepted as the term power, but it was the transmission of a different form of energy, one only of the many forms that are co-related one to the other. It is in the very last decade of this century that the transmission of power has come to have a meaning of greater importance than was ever dreamed of in Franklin's day, or even when Michael Faraday and others laid the foundation of the mass of valuable knowledge that was ready to be used to advantage when the needs of man called for its practical application.

It is interesting to note that although the actual transmission of power in large amounts by electricity has been carried out chiefly in the last few years, yet what is now being accomplished is the result of knowledge that was obtained quite early in the present century. Faraday's great discoveries began in 1830, and these, with what had been contributed by a host of workers before him, bore fruit before the end of the first half of the nineteenth century.

I will not take up your time with recounting the steps that led up to what forms the substance of our scientific knowledge of electricity, nor to even mention the names of the great men who have contributed to our store of information. With electricity it is very much as in the case of the locomotive, that became an established fact and an important factor in our civilization in 1827, but was anticipated and predicted by those who in a crude way operated steam carriages on common roads before that date; and long before a fairly perfect locomotive was placed upon iron rails the railroad had been demonstrated to be of advantage even with animal traction in mining operations. The iron railroad and the

steam engine on wheels had to be brought together to make a perfect whole.

The beginning of this century saw in our country and by our own people the first great steps taken to make our railroad system of transportation possible through the demonstration of the advantage of using high-pressure steam. This knowledge was necessary even to make the steamboat a commercial success on the inland waters of the United States. On March 2, 1825, at the end of the first quarter of this century, refrigeration by rarefaction of air was being discussed.[1] This fact will be worth remembering when I come to speak briefly of the recent transmissions of energy by other means than electricity. Prof. S. F. B. Morse, as early as 1832, had formed an idea of his electro-magnetic system of electric telegraphing, and in 1835 he constructed his first recording telegraph instrument and used it on short distances, but it was not until 1843 that Congress, after great opposition, voted the sum of $43,000 to construct the line of communication between Washington and Baltimore, which was put in successful operation by 1844, thus giving an illustration of long-distance transmission of power to energize the magnets that gave motion to the instruments required in telegraphy. On December 16, 1848, Prof. Henry, in his second annual report to the Board of Regents of the Smithsonian Institution, proposed that so far as the funds of the Institution would permit, the magnetic telegraph be used in the investigation of atmospheric phenomena, in order that notice of the approach of storms might be given to distant observers. This was just four years after the electric telegraph had been installed.

On March 19, 1853, forty-six years ago, Prof. Henry, in an address at the close of the exhibition of the Metropolitan Mechanics' Institute at Washington, explained the true relation between power and the means at command for transmitting and utilizing power. He pointed out an error in text-books even of that late day, when elementary machines—namely, the lever, the wheel, the axle, the inclined plane, the pulley and the screw, employed separately as instruments for the application of power, or in combination as parts of complex machines—were classed as "mechanical powers," "when every tyro in science," he says, "knows they have no power in themselves; yet, through a wrong name and

[1] See Prof. Jos. Henry's paper on this subject, read before the Albany Institute on the date above mentioned.

a misapplication of the word power, a pernicious error is perpetuated long after the fallacy is understood." He gave a list of what could be classed as the primary powers as used by man. "First, water power; second, wind power; third, tide power; fourth, the power of combustion; fifth, the power of vital action," remarking that "the power of volcanoes and the internal heat of the earth were as yet unused powers." Beyond these few, he says, "science gives no indication of any other." He did not mention the direct heat of the sun as a source of power. He, however, remarked that "Gravitation, electricity, galvanism, magnetism and chemical affinity can never be employed as original sources of power; they are at the surface of the earth forces of equilibrium, the normal condition of which must be disturbed before they can manifest power, and then the work they can do is only (approximately) equal to the power which was communicated to them in disturbing their state of rest."

Electricity is not, he said, in itself a source of power, yet, what is very important from his point of view, "electricity, from its extreme mobility and high elasticity, affords the means of transmitting power with scarcely any loss and almost inconceivable velocity to the greatest distance; a wave of disturbance starting from the impulse given at the battery will traverse the circumference of the earth in less time than I have been occupying in stating the fact." This is interesting, but we are yet far from realizing the consummation of this idea. When Prof. Henry uttered these words the electric telegraph had become a public necessity, energy had been transmitted over great distances and people had ceased to wonder.

"The telegraph," he said, "could not possibly have been invented, the most ingenious synthetical mind could not have contrived the electro-magnetic telegraph, until Galvani and Oersted had made their discoveries." The transmission of power by electricity, however, has been possible, in varying degrees of efficiency, almost since 1832, and yet two years ago, as I said before, I felt that in its highest degree of efficiency I had not the right to say it could be presented, in a satisfactory way, to the American Philosophical Society in a manner worthy of its founder, who of all men of his day thought chiefly of the practical side of such a subject.

When Prof. Joseph Henry spoke of the possibility of transmitting

an electric impulse around the globe, it was the impulse from a *galvanic battery*. No dynamo had been used in place of a battery, although instruments had been constructed to demonstrate the fact that the dynamo could be used. The electro-magnet was well understood, the electric impulse had been made to give motion to machines from electro-magnets and from permanent magnets, and the relation of the various forms of energy, represented by light, heat, magnetism, etc., were each and all known to be what has since been termed "modes of motion."

In the year 1876, marking a century in the age of our Republic, there was given to the world, through the grand Centennial Exhibition in Philadelphia, an object-lesson in the state of the arts and the advance of knowledge. The buildings in Fairmount Park, however, were not lighted by electricity, although the arc light, with clockwork to keep the carbons in proper relation to each other, was used for experimental purposes long before. As to the use of the arc light, on the 8th of December, 1858, the high light at South Foreland was illuminated by an electric current generated by one of Holmes' magneto-electric machines. In 1863 the electric light was applied to the lighthouse at La Hève, France. The chemical action of electricity was known when Carlyle and Nicholson discovered in the year 1800 that water could, by means of electricity, be resolved into its two component gases, oxygen and hydrogen, by means of the voltaic pile. Sir Humphrey Davy by the same means, seven years later, proved true Lavoissier's suspicion that the alkalies potash and sodium were not simple bodies, but compound, by the discovery of five new metals by electrolysis, viz., potassium, sodium, barium, strontian and calcium. I shall refer to one of these metals when I come to speak of the transmission of energy from one common source of power in a condition ready for use, either for turning the wheels of factories, for heating, lighting or repeating Sir Humphrey Davy's process in the production of sodium from an alkali, not as a laboratory experiment, but on a commercial scale at the rate of many tons per day.

In tracing the progress of knowledge bearing upon the transmission of energy by electricity, the United States Patent Office records furnish much information of a historical character useful for determining the chronological sequence of invention, and no more interesting chapter in the history could be obtained than that on the application of the modern dynamo by telegraph companies to

supersede the galvanic batteries that for so many years supplied the electricity needed for their purpose.

There are to be found a number of patents relating to the regulation of the electro-motive force from the dynamo to equalize the pressure on lines of different lengths and different resistances. It was not, however, until lighting by electricity became a necessity in the most recent times that the great demand for electric machinery for lighting purposes, which so alarmed the gas companies, and threatened for a while even to destroy the value of the capital invested in this great branch of industry, namely, illumination by gas, became a commercial necessity. It was then that mechanical engineering talent of a high order was added to the electrical knowledge of the time to increase the efficiency of direct-current dynamos for lighting and for furnishing power in small amounts. Large establishments sprang up in Europe and in America for the manufacture of electrical machinery on an extensive scale, finally leading to the foundation of the present great corporations, whose stock is quoted among the "Industrials" listed on the Stock Exchanges of the country. Ten years ago, in 1889, these companies were doing a thriving business; yet at that time there had been little accomplished in the direction of the actual transmission of *power* by electricity, in contradistinction to the transmission of energy for lighting purposes.

I have preferred to entitle my discourse "The Transmission of Energy" rather than of "power," because the latter term serves rather to suggest kinetic energy, or the energy of matter in motion, while electricity permits the transmission of many sorts of energy. The turbine wheels at Niagara, nominally of 5000 horse power, generate kinetic energy from the water put in motion by gravity. The dynamo driven by the turbine delivers 5000 electric horse power; so efficiently is the change from kinetic to electric energy effected in this case by the dynamo that all the electric and magnetic losses in that part of the machinery amount to less than two and one-half per cent., apart from the losses due mechanical friction and windage, which are light as compared to what has been done by smaller units of power.

In the autumn of 1889 I was asked to submit a report on the transmission of power by electricity by gentlemen who had become interested in what was then known as the Evershed scheme of utilization of power of Niagara Falls, on land above the head of the

American Rapids, and above the entrance to the canal that was constructed more than forty years before to carry water from the Niagara river to factories located on the edge of the cliff, where the fall obtainable for turbines was as much as two hundred feet, though only from ninety to perhaps one hundred and twenty feet fall had been used to drive turbines. Mr. Thomas Evershed, when Chief Engineer of the State of New York, conceived the idea of locating turbines in wheel-pits sunk to a sufficient depth upon the level land above the rapids, where, under a head of sixty to one hundred feet, turbines could be operated by water carried to them through short surface canals, while the discharge from the turbines could be carried away by a tunnel serving as a tail race, this tunnel to proceed in a direct line under the city of Niagara Falls to the gorge below the falls. His scheme had been made the foundation of a charter granted to a company to construct the tunnel and such canals as might be needed for power and sewerage purposes, whereby the land on the river bank above the falls might be utilized as a manufacturing area, as at Lowell, Holyoke and other places where industries have prospered through the enterprise of the companies controlling the water privileges.

To carry out the Evershed plan involved the expenditure of very large sums of money for the tunnel and for surface canals. To effect the purpose, the Niagara Falls Power Company was organized in 1890. The Cataract Construction Company and other allied companies were started at the same time to execute the work, to improve the lands owned or controlled by those interested and to furnish transportation facilities to a large industrial district, where a uniform water power, without fear of low water or freshets, would be obtained. In the first conception of this water-power company, a central station was contemplated from which power might be transmitted to Buffalo and elsewhere, either by electricity or by some of the several modes of transmission of power already used to some advantage in Switzerland and elsewhere, where water power is abundant, coal costly and transmission for a few miles by wire rope or other means had been undertaken with marked success.

In July, 1890, I was suddenly summoned to London to confer with Mr. Edward D. Adams, the President of the Cataract Construction Company, who was alive to the great advantage of long-distance transmission by electricity, his idea being that the central-

ization of power and its transmission by electricity over the whole territory was feasible; hence he ordered work stopped until a careful examination could be made as to the state of the art of electricity in comparison with other modes of transmission.

To obtain reliable information on this important subject, the Niagara Falls International Commission was organized in July, 1890, with Lord Kelvin as Chairman; Prof. Wm. C. Unwin, Dean of the South Kensington Technical School, as Secretary; Prof. E. Mascart, of Paris, as representative of France, the birthplace of the modern turbine water-wheel; Col. T. Turrettini, Mayor of the City of Geneva, an engineer of great note, as representative of Switzerland, and as the engineer of the works at Geneva where power was being transmitted by water under high head; and I was appointed the representative of the United States and of the company for which the information was to be collected. By and through the work of this Commission, the opinion of engineers and engineering companies was obtained as to the best way of developing the power on the land of the company, under conditions laid down by the American company, also the utilization by transmission of the power so developed. A sum of money was paid to each competitor to cover the cost of reports, while premiums were offered to those who should present feasible schemes that could be immediately made use of for either or both of the two parts of the scheme—first, the generation of power, and, second, its transmission.

The information so gained represented the accumulated knowledge of men who could speak knowingly as to the state of the art on both of these subjects at that time. It was well worth its cost, but no perfect scheme, ready for immediate adoption and worthy of the highest premium, was presented. The Westinghouse Electric and Manufacturing Company, of Pittsburg, already interested in utilizing the alternating-current system for lighting and power purposes, having previously spent enormous sums of money to develop the alternating-current motors, generally known as the Tesla system, refused to compete on the ground that what would be offered in 1890 and 1891 could not possibly be what they might be able to submit in 1893; nor could any one suggest what would meet all the conditions which might arise during the development of the hydraulic part of their enterprise on a scale so much larger

than ever before undertaken. This non-competing company, however, a few years after executed much of the work required.

A majority of the Commissioners favored the transmission by direct current, but as they were not asked to express an opinion in that direction, there was no report made as to the character of the electric current if electrical transmission should be decided upon; but a unanimous opinion was given as to the advantage of a unit of 5000 horse power for each turbine in the power house, working under a head of not over 140 feet fall, at a speed of 250 revolutions per minute, which was feasible with turbines that could be made of high efficiency.

The speed recommended was thought to be what would be acceptable to makers of dynamos, whether for alternate or direct current. It is noteworthy, as indicative of the state of the art in 1891, that out of many electrical schemes proposed all but two were based on the generation of the direct current, with the consensus of opinion in favor of the gramme ring as the type of armature.

While waiting for the reports of competing engineers to come in, between July of 1890 and the first of January, 1891, I had time to visit Italy, France, Switzerland and England, where I collected information as to the efficiency of the several modes of transmitting power at that time in vogue. I could find but one example in France of power for factory purposes transmitted by direct current, in which case a turbine was located in a rugged mountainous district, quite inaccessible in winter. The water-wheel, of perhaps 200 horse power, drove a direct-current dynamo, from which the current was conveyed by overhead conductors to a direct-current motor in a paper-mill, in a small town, a distance of five miles. This paper-mill had been operated without profit by steam, but was said to be profitable under the new conditions. The machinery in this case was started and stopped at the turbine by means of telephone communication from the mill to the men in charge at the water power. I visited many interesting plants for the transmission of power by water under pressure and by compressed air, and saw the most important electrical developments for lighting purposes, some by the alternate current, but most by the use of the direct current.

In Paris I made a careful examination of the Popp system of compressed air with great interest, on account of the highly favorable reports that had reached me and the claims as to efficiency

and economy made by the projector. He even went so far as to say that in case of transmitting power from a central station to an outlying electric light plant he would use compressed air for the purpose, using air to drive the engines connected to the dynamos at the lighting stations, instead of transmitting electricity ready for immediate use. Among his various plans of using compressed air, besides operating air motors, elevators and the like, he had published a long list of uses to which it was applicable; he also submitted to the Government his cold storage scheme. In the event of foreign invasion and the investment of Paris, when local industries might be stopped, he stated that by using the compressed air from part of his compressing plant to drive the engines that operated the compressors of the other part, and utilizing the exhaust from these air-driven compressors in the Government storehouses, he could thus lower their temperature to the required degree, on the principle of refrigeration by rarefaction of air after having exerted force, as discussed by Prof. Henry on March 2, 1825, and as afterward toward 1850 used for the artificial production of ice.

The alternate-current lighting plant of Deptford, London, established in 1889, was predicated on the possible generation of electricity in large units of 10,000 volts pressure. I spent much time in watching this experiment, which was in 1891 far from meeting the expectations of its promoters. The 10,000 horse-power engines and direct connected 10,000 horse-power dynamos were never finished.

In Rome I found the most promising scheme under way to utilize the water power at Tivoli to generate a single-phase, alternate current, to be transmitted a distance of twenty-five miles to the gates of Rome by overhead cables, at a pressure of about 5000 volts, with perhaps twelve per cent. loss in transmission. The Roman plant was interesting, as in it the question of rate of alternation per second had been considered, and Ganz & Co., of Budapest, had recommended the lowest periodicity, forty-two full alternations per second, as adapted to arc and incandescent lights on the same feeders. If the rate of alternation per second be less than forty-two full periods arc lights will pulsate, while in the case of incandescent lights by alternating current the rate of alternation may be carried as low as twenty per second, depending upon the thickness of the filament, with no perceptible effect on my eyes. But in common practice seventy-two full periods per second has been

adopted by electric lighting companies, as thereby the local transformers that are used to reduce, from street conductors under a pressure of 2000 volts to 100 volts in houses, are small and inexpensive; much more so than if similar machines were wound for as low a periodicity as forty-two per second. This question of period or rate of alternation per second has since come to be recognized as an important consideration in the transmission of electric energy for power purposes, and bears directly on the question of efficiency, convenience and economy in the conduct of the power-house equipment at Niagara Falls. There is so much of interest that may be said on this subject that I am loath to leave it to speak of what resulted from the study of the problems between 1890 and 1893, when in 1893 the installation of hydraulic machinery was to be begun, and an electric system adopted and put in practice ready for operation. In 1895 but one single tenant, the Niagara Falls Paper Company, now using over 7200 horse power from the surface canal of the company, was and still is the only example we have of a factory controlling its own water power directly connected to its machinery, as at Lowell and elsewhere.

During the year 1893 all idea of extending the tunnel beyond a proposed power house, and all extension of surface canal with branches to supply local factories, was given up in favor of electrical generation and transmission thereof to the users in such form as to be acceptable to the industries established on the land of the company. In the year 1893, while the greatest pressure was being exerted to induce the Cataract Construction Company to adopt the direct-current system, Mr. Edward D. Adams and the other officers of the company had before them a diagrammatic plan showing a central station for the generation of alternate-current electricity, from which conductors were figured as leading to electric furnaces, to apparatus that was capable of converting the alternate current into direct current, either by synchronous motors driving direct-current dynamos or by step-down or step-up transformers and rotary transformers that accomplished the same end. Lighting by arc and incandescent lamps was provided for, and trolley lines were designated as in operation, while an overhead pole line was figured as transmitting the energy to Buffalo or elsewhere, at any required pressure. Nothing could be more convincing than this diagram to show the elasticity of the alternate current, which was confirmed by a practical exhibition offered at Pittsburg by the Westinghouse

Company, and later a similar exhibit was given at Lynn, Mass., by the General Electric Company, the former by bi-phase generation and transmission, the latter by tri-phase.

After a most careful study of the subject from a scientific and commercial point of view, the bi-phase system of twenty-five alternations per second was adopted by the Cataract Construction Company. When such a low rate of alternation was discussed, it was apprehended that the cost of static transformers would be so much increased as to more than counterbalance the efficiency promised by the lowering of the rate of alternation; but, as in many other cases, when a want is felt, the urgency of the want leads to improvements that entirely change the conditions; so in this case, while many predicted that static transformers of this low period would cost from fifteen to twenty or even twenty-five dollars per horse power, still when tenders were to be solicited a guarantee had been exacted that the price should not exceed five dollars per horse power, while in actual practice, in healthy competition, the machinery for the purpose was secured at a very much lower rate.

As to the results reached by the system adopted, I must call your attention to the remarkable character of the industries that clustered about the central station. In 1893 there were no bi-phase motors of high efficiency manufactured, as up to the last few years alternate-current electric lighting plants had not been adapted to the operation of highly efficient motors to take the place of steam engines. There were few if any applicants for power to drive machinery. No cotton mills or other textile industries sought cheap power when it involved the use of machinery that had yet to be perfected. Existing direct-current motors could be had in abundance, but manufacturers had not yet used them. The largest cotton or woolen mills required not over 1000 horse power to drive them, while most are on a smaller scale.

The advantages offered by the elastic electric system at Niagara Falls attracted industries that employed few hands, needed little machinery, but required enormous amounts of power, which, at a lower cost than steam and without an investment in engines and dynamos, could be used profitably.

The Pittsburg Reduction Company, engaged in the extraction of the metal aluminum from its ores, was the first applicant for 1500 to 3000 horse-power electric current from the new power-house. This process, known as the Hall process, required heat energy to

melt the cryolite to form the bath in the electric furnace, and a direct current of low voltage to exercise electrolytic energy in separating the metal from bauxite, which is rich in aluminum. Another enterprise, the Carborundum Company, called for 1000 horse power, in alternate current of one phase only, for a process in which heat energy alone is needed to produce a new mineral next in hardness below the diamond. So with the manufacture of carbide of calcium from coke and lime, great heat alone needed was obtainable by alternate current. The Matheson Alkali Company, making caustic soda from common salt, needed no heat energy, but over 2000 horse power of direct current for electrolytic or electro-chemical energy in a cold process to separate the chlorine gas from the salt water, the gas being delivered into enormous lead-lined chambers, the floor of each chamber being covered with lime, enabled twenty-five tons per day of bleaching powder to be furnished to the market, while the caustic soda liquor, freed from chlorine, is concentrated by boiling in iron kettles to evaporate the water and thus leave caustic soda in solid form when cold. This caustic soda, delivered to still another factory near at hand, is by a direct current, furnishing heat and electrolytic energy, made to yield pure metal sodium, just as Sir Humphrey Davy did when, with the current from a galvanic battery, he produced and gave to the world a few ounces of the new metal. The ingots of sodium, as made by the Chemical Construction Company, at Niagara Falls, are dipped into coal oil and thrown into tin cans, to be closed air-tight, ready for the market, or at once, by a simple process, converted into peroxide of sodium, one of the most powerful oxidizing reagents required in the arts. Factory after factory has been added, for various electro-chemical processes, while the establishments first started have grown in size calling for power in a rapidly increasing ratio.

While these industries were developing, electricity has been furnished to the lighting station to replace steam as the motive power, and a direct current is being delivered to the trolley lines of Niagara Falls and Buffalo. By the time the development was in shape to offer power to Buffalo, and the cost of installation was being worked out there, one great advantage of the tri-phase system over the bi-phase that had been adopted was urged as an important argument against what had been done. This advantage comes from the fact that the bi-phase transmission needs four cables, two

for each phase, while the tri-phase system is worked with three cables only, each of the three cables being no larger than each of the four demanded by the bi-phase system. This advantage had been taken into consideration, but other economies incident to the bi-phase had overbalanced the question of saving in copper in the line. Before the line to Buffalo could be built, however, and as a striking instance of an urgent need of exciting the talent of inventors to supply the want, Mr. C. F. Scott, of the Westinghouse Company, startled the electricians at a meeting in Washington with his scheme of converting the bi-phase current into a tri-phase in the static transformers that are used to raise the electro-motive force of the current from 2200 volts to 11,000 volts or more—this without adding one dollar to the actual cost of the transformers needed, and with the saving of twenty-five per cent. in the copper used, which must be credited to the tri-phase transmission. So that while the low frequency adopted increased the efficiency of the plant, and favored many operations of the power plant, the first cost was not affected by the prophesied high cost of transformers, and all the advantages incident to both systems were obtained not only without an increase of the first cost, but a direct saving in the copper of the line. As the plant grew in size, many of the difficulties that had been expected in handling such an immense volume of electricity as was involved did not occur, and it was evident that the practical electricians attached to the great manufacturing establishments of electrical machinery had brought the appliances needed well up to the requirements of the new conditions. Every machine, every instrument needed, had to be contrived, not only to suit the size of the unit of 5000 horse power, but to meet the unknown effect of coupling so many great machines in parallel and distributing the current to establishments over which the attendants in the power-house have little or no control.

In thus referring to the utilization of power at Niagara Falls, I may seem to depart from the subject of transmission of energy, although the development of the industries described is intended to illustrate the direct results obtained by transmitted energy. The energy developed at the dynamos in the power-house, and existing as potential only while the dynamos are in motion, begins with an electro-magnetic force of 2200 volts, at which 5000 electrical horse power is transmitted by four cables, each $1\frac{1}{4}''$ in diameter, two cables for each phase of each dynamo, to the bus bars from which the

current is distributed at from 2200 to 2000 volts (depending on distance) to points outside of the power-house within a radius of two miles. By means of step-up transformers 10,000 electric horse power of induced current of 11,000 volts can be carried to Buffalo by six cables, each 5/8″ in diameter, and capable of transmitting 10,000 electric horse power at the said voltage, or double that amount, at 22,000 volts, with a loss, based on Lord Kelvin's law of economy as to size of conductors.[1] You can better realize the idea of the size of the conductors when I tell you that from each turbine exerting over 5000 horse power a steel shaft 11″ in diameter is needed to drive each dynamo delivering 5000 electrical horse power, from which are carried the conductors of the sizes named. Four bus bars receive the current from five dynamos, the heaviest part of each bus bar being 3″ in diameter; *i. e.*, one 11″ steel shaft transmits kinetic energy of 5500 horse power; four 1¼″ cables transmit 5000 electric horse power energy of 2200 volts; three 5/8″ cables transmit 5000 electric horse power to Buffalo.

Besides the development of power at Niagara Falls, to which I have called your attention, numerous successful installations in various parts of our country could be referred to, and even in Europe we find the transmission of power by alternating current in existence, and, in fact, in some instances preceding in actual operation the starting of the plant at Niagara Falls; such installations being on a smaller scale required less time to construct them.

[1] Lord Kelvin proposed, in determining the size of conductors for electricity, that the most economical area of conductor is that for which the annual cost of energy wasted is equal to the interest on that portion of the capital outlay which can be considered to be proportionate to the weight of the metal used; that is to say, the amount of copper and other details of the transmission line, the interest of which should equal that amount of energy at its cost of production that may be wasted. The lower the cost of the power generated the more energy may be wasted to advantage. If too large a conductor is installed for the purpose of decreasing the loss, the capital outlay will be needlessly great. If too small a conductor is adopted the waste of energy will be too great, hence the importance of a law that indicates what the economical loss should be. In applying this law there is more or less divergence of opinion as to what part of the capital outlay should be taken into consideration in determining the amount to be wasted. As, for instance, an underground conduit system may be built to accommodate a great increase of the number of conductors installed, or when a pole line is erected for a given amount of power, additional conductors may be supported on the same poles without any great increase of the cost due to enlarging the capacity of the transmitting line. The law, therefore, bears with most force on the metal if naked or the cable if the conductor is insulated.

The experiments of Mr. Tesla, which were directed toward the utilization of an alternate electric current of high frequency, and which were conducted in the interest of the Westinghouse Company, resulted in the issue of at least twenty-nine patents to cover the multiphase generation of electricity. The first of these patents was issued as early as 1888, and the last in 1891, and yet in 1893, so far as I am aware, there were no examples of the Tesla motors in commercial operation, for the reason that up to that time—and, in fact, not until 1895—the conditions had not been favorable to its development. As soon as there seemed to be a demand for their use, however, the manufacturers placed them on the market with as high an efficiency as the best direct-current motors, with this further advantage that is of the utmost importance: A direct-current motor and a direct-current dynamo are limited in their electro-motive force by the commutator necessary for their operation. The earliest alternating-current motors were what are known as synchronous motors; that is, motors that when started would run in step with the dynamo from which the current proceeded. These motors had no self-starting power, and involved many objectionable features that are not incident to polyphase motors of the induction type—in other words, what we know as the Tesla motor. In the first place, and as of vital importance, a Tesla motor can be wound to suit high voltage. Electricity at 2000 volts can be carried with absolute safety by properly insulated cables into buildings and applied directly to the motor without any live terminals; that is, without any part carrying current being exposed from which a dangerous shock of electricity can be obtained. They are all self-contained. They start with a powerful torque upon completing the circuit; that is, they start when the switch is closed and stop when the switch is open. Here is the possibility of an ideal electric motor, which is perfectly well understood by professional electricians, but about which the public have yet to be more thoroughly informed.

Though I have said that little was known about the alternating current in practice until lately, yet I have before me a copy of a letter written by Mr. L. B. Stillwell, one of our members, the Electrical Director of the Niagara Falls Power Company, when he was on the staff of the Westinghouse Company, dated May 11, 1893, in which he said: "I received yesterday from our engineer in charge of the installation at Pomona, Cal., a report of tests which he had

been making, and I think you will be interested to learn that he has successfully transmitted 130 horse power over eighty-four miles of bare copper wire, supported upon our special insulators; the length of the circuits being eighty-four miles, the conditions are of course such as we should encounter in transmission over forty-two miles. The result was obtained by connecting up in series the respective circuits from the power plant to the town of Pomona and the city of San Bernardino. About 3200 insulators supported the conductor carrying 10,000 volts, and the fact that this was done without the slightest evidence of break-down was noteworthy and important." Since then on some of the Western lines 20,000 volts have been considered moderately low voltage, and 40,000 volts have been used successfully, and this all since the year in which bids were first asked for polyphase alternating-current dynamos under stated conditions by the Cataract Construction Company for the Niagara Falls Power Company at Niagara.

Mr. Edward D. Adams, the president of the Cataract Construction Company, to whom the above letter was addressed, was thoroughly alive to the advantage of the use of the alternating-current system in 1890, but in financiering the great development at Niagara Falls he held his mind open for truth, which he steadily pursued from the beginning, sustained by those interested with him, regardless of his own pecuniary interest and that of his personal friends.

My own interest in electricity began in early boyhood. As soon as I was able I followed the discoveries of Faraday and others experimentally, using instruments made by myself for the purpose. From 1846 to nearly 1849 I was engaged to superintend rolling iron and making the telegraph wire that was used in the first lines established west of the Allegheny Mountains. Keeping in touch with progress of the uses to which electricity has been applied, I have noted how powerfully the growing needs excite the inventive faculty of those engaged in any one branch of science; in general, also, the slow application to actual practice of knowledge given to the world by men seeking truth and laying the foundation of exact scientific methods. Our modern knowledge of thermo-dynamics does not express what was used to perfect the steam engine, as the best results and the greatest advance in the use of steam came before the students of thermo-dynamics gave us the modern text-book on the theory of steam. So it is with the trans-

mission of energy by electricity: beyond the possession of useful knowledge, actual practice and the attempt to accomplish results will yet need many venturesome efforts.

In utilizing the power of Niagara Falls large units of power have been shown to be economical. A single dynamo built to yield 5000 electrical horse power has yielded 5600 electrical horse power without sign of overload. The wonderful efficiency of these machines, which have a loss of less than two and one-half per cent., has established the superiority of electrical transmission of power, and proved it to be more economical than any of the usual methods of transmission by material in motion; that is to say, by shafting, belting or compressed air, etc. All such methods involve great frictional loss. When a steam engine is attached directly to a dynamo, the electrical output of the dynamo, measured by modern instruments of precision, is known to be more reliable as an indication of the power produced by the combustion of a given amount of coal than any ordinary method of indicating the power of a steam engine to determine the horse power per pound of coal burned. Large factories, such as the Baldwin Locomotive Works, have recognized the economy of generating electricity by steam and transmitting it to the various machines or groups of machines in use, to which electric motors are applied, thus dispensing with long lines of shafting. How far electricity can be transmitted from the turbines at Niagara Falls with profit remains yet to be determined. The actual economy obtained by transmission to Buffalo, say a distance of twenty-two miles, is so much beyond what was predicated as possible in 1890, or even 1893, that no one can venture to say what will be forthcoming in the near future. With electricity it is very much as it was with railroads; fifteen miles per hour was thought to be a dangerous speed when locomotives began to supersede the stage coach. Those who travel now hope for an improvement that will lead to a higher rate of speed than we are now accustomed to. So it is with electricity by overhead lines of transmission. One thousand volts is no less dangerous than 11,000 volts on the Buffalo line, or 20,000 or 30,000 on some of the air lines in this country.

The question of underground transmission calls for a high quality of insulating material or method of preventing leakage, and of providing means of dissipating the heat that must result from any loss due to resistance in the conducting material used.

Copper is, of the available materials, the best conductor and the cheapest. The price of aluminum, however, owing to the cheap power used in its manufacture, has fallen from five dollars per pound to twenty-five cents per pound. Pure aluminum, properly alloyed with a metal that will increase its strength without decreasing its conducting quality, renders it possible at the present time for aluminum conductors to be offered at exactly the same price per mile as copper, with the added advantage of allowing the poles supporting the line to be placed much farther apart, thus using fewer insulators and decreasing the cost of the line; also insuring more economy in transmission, as there is less leakage, due to the diminished number of supports, all of which will be weak points in the transmitting system. The increased area required for the lighter metal, resulting in a larger radiating surface, is favorable also to the dissipation of the heat engendered by the resistance in the line, as whatever energy is lost in such transmission assumes the form of heat energy.

What can this or any other learned Society do to help in the promotion of the knowledge of electricity applied to the use of man? It is a matter of great importance to those interested in the work of this Society that they recognize the necessity of exerting themselves to carry out the intent of its founder in promoting useful knowledge. We must try to induce the members and others to make use of the advantages that the Society possesses in disseminating useful knowledge through its publications, and to make this building and these rooms the place for the discussion of subjects of practical as well as theoretical importance in the same direction, on the lines so earnestly followed by its founder, who tried to bring together representative men of varied attainments and to have them submit papers for discussion.

In my efforts to interest members in our work in the direction of the subject of this discourse, and to have them submit papers for discussion, I have been met, first, with the excuse of want of time for the preparation of matter; second, the desire of most specialists to contribute to the societies devoted to their specialties; third, to the fact that there are so many periodicals for each special department of science ready and eager to obtain, even to pay for, copy, and in the case of electricity as applied to the service of man many of the professors of physics in colleges, specialists besides those on the staffs of the great manufacturing companies, are re-

tained in the interest of such companies, and in some cases are even discouraged from making public what for a time can be used to advantage in a commercial way and classed among the trade secrets. I speak knowingly on this subject, for the first question that was asked me in 1889, before I was solicited to report on the subject of transmission of power by electricity, was whether I was retained in the interest of any electric company. The fact that patent litigation has played so important a part in the development of electricity is also to be taken into account when an effort is made to awaken debate on subjects that should be of special interest in the Society founded by the early electrician, Benjamin Franklin. Many men are loath to commit themselves in debate that may in a short time be taken hold of by patent attorneys. The commercial aspect of scientific advance is too important to be ignored; we must therefore, as members of the American Philosophical Society, as far as we can, induce others to assist in the work of the Society by showing a willingness to take an active part in the meetings that are held in this room, and by early publication of matter submitted give precedent in publication to those who lay claims to priority of discovery.

Stated Meeting, April 21, 1899.

Vice-President SELLERS in the Chair.

Present, 17 members.

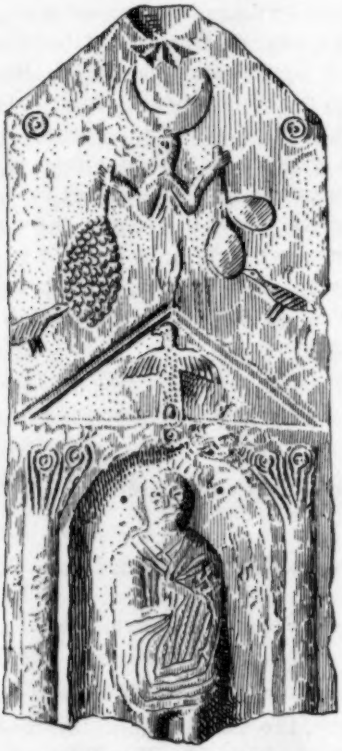
The Curators announced that, in accordance with a resolution of the Society, the Carthaginian tombstone in its possession had been photographed, and exhibited a blue print of same (see accompanying figure, page 72).

The death of Sir Monier-Monier Williams, of London, England, April 11, 1899, who was elected a member December 17, 1886, was announced.

Dr. Stellwagen made a verbal communication to the Society in regard to a tombstone presented by Commodore Stellwagen,

on behalf of Mr. Perry, which was brought from Carthage. He said:

It was in the spring of 1864, if my memory serves me correctly, that, at the urgent request of the Consul-General of the United States, Mr. Amos Perry, the U. S. S. "Constellation," of which I was an officer, paid a visit to the Bey of Tunis, as trouble with the Bedouins had caused alarm among the European residents.



Carthaginian Tombstone.

The Consul requested my father, Captain Henry S. Stellwagen, U. S. Navy, to bring two gravestones or stelæ to this country and send one each to scientific bodies in Philadelphia and New York. The one exhibited here this evening was first given into the care of the Academy of Natural Sciences, but afterwards, at the suggestion of an officer of that body, it was sent to the American Philosophical Society.

At the time of our visit the ruins of Carthage were so completely

hidden by the overlying soil and fine débris that the localities of the famous city were but vaguely known. This stone stela was found in the region of the temple of Astarte, and by many of those who examined it the relief was considered to be a figure of the Goddess Astarte feeding carnivorous, and presumably sacred, animals with the entrails and genitals of the victim of a sacrifice.

I was discouraged at the very meagre results obtained by antiquarians who had studied the locality, and shocked to contemplate how entirely that great city was obliterated. Once she claimed to control the whole western Mediterranean Sea so effectually that "no one could wash his hands in it without her permission." Her fleets and armies, her agriculture and pomology, her stock raising and her temples are only known to us through her enemies, the Romans; but these naturally biased historians freely acknowledged that she excelled the world. At the time of our visit only mounds of earth were to be seen there, covered with very small fragments of different-colored marbles, some fine large pieces of marble steps that evidently had formed portions of a great stairway to the sea gate, and a number of large subterranean reservoirs supposed to have been used for water storage, these being in pretty fair condition, and in strong contrast with the utter and absolute ruin of all else.

Which was followed by a verbal communication by Dr. Morris, as follows:

It has been said that Abdel Kader when brought as a prisoner to Paris was taken to Versailles and asked his opinion as to the celebrated paintings of the battles in Africa, where he had borne such an heroic part. He replied that "if an Arab had portrayed them he would probably have done so very differently." It is well for us to remember that nearly all we know of the Carthaginian empire, people or customs has come to us through Roman sources, and that the "Punica fides" which we have learned of in our childhood might seem very different if heard of from the other side. While I would not be considered as an apologist for the worship of Astarte, which we know of from Syrian and Phœnician as well as from Greek and Roman sources, passing as it does into that of Aphrodite and Nero, of Venus and Juno, or of sexual love, whether normal and pure or abnormal and illicit, it still remains true that

C'est toûjours l'amour, l'amour,
Qui fait le monde à la ronde.

Human nature has been and is the same in all climes, ages, civilizations and religions; and it behooves us in inquiring about them to treat them fairly as we would seek to have done to our own views. It is in this manner I would study this relic, all too rare, as our friend, Dr. Thomas C. Stellwagen has just shown us, of Carthaginian civilization. It is a white sandstone slab, the lower part of which has been broken off and the upper corners sloped nearly but not quite to a point. It is 2 feet 5 inches

long, 1 foot 1¼ inches broad, and 5 inches thick. At the top is a ✳, which I take to be intended to represent the sun: on each of the corners of the sloping and straight sides two small concentric circles ⊙, which I take as intended to represent planets (Mars and Jupiter?): and on the upper part of the slab the figure of Astarte with its crescent, holding a pomegranate in the right hand, from which a beast is feasting, and in the left a bunch of dates plucked at by a bird. Under this figure of Astarte, thus emblematic of the love-passion as alike furnishing fertility and prosperity to all living beings, is the entablature of a temple or house with rude Corinthian columns, and an eagle, while beneath is the figure of a man calmly standing, wrapped in a robe. Herodianus (*circa* 150 A.D.) tells us of the custom prevailing at the beatification of an emperor among the Romans. An eagle was bound on the funeral pyre so that when it was lighted and the bonds burned the living bird soared aloft bearing the soul of the deceased to the empyrean, and the Imperator became Divus. May not this well explain this figure standing in the porch of the house or temple ready to pass through the region presided over by Love into the vast beyond where Light and Order still prevail? and how far would such a faith differ from that held by the most of us to-day?

This stone, I believe, formed the doorway of a vault or sarcophagus such as may be not infrequently found on or near the shores of the Mediterranean, and may well aid us in our inquiries into the real beliefs of those who passed so long ago into the Great Beyond.

On each side of the head of the man's figure is a small hole such as would receive a tenon on a bronze plaque, which may have covered this figure, as we see brasses on the graves of Crusaders in old cathedrals. If this were so, this monument, had it contained the man's name, would have, like Horace's, proved "Aere perennius."

The Society was adjourned by the presiding officer.

Stated Meeting, May 5, 1899.

Vice-President SELLERS in the Chair.

Present, 21 members.

Gen. Isaac J. Wistar read an obituary notice of the late Richard A. Tilghman.

The Secretaries announced the death at Philadelphia, on May 2, of Alexander Biddle, aged 80 years.

The following papers were read:

By Mr. R. H. Mathews, of Parramatta, New South Wales, "On Divisions of North Australian Tribes."

By Dr. Rudolph Buti, of Baltimore, "On an Interesting Fragment of the Book of the Dead."

By the Committee on Historical Manuscripts, "A Calendar of the Weedon and of the Richard Henry and Arthur Lee Correspondence in the Library of the Society."

Dr. Samuel G. Dixon was elected a Councillor to fill the unexpired term of Gen. Isaac J. Wistar, made vacant by his election as a Vice-President of the Society.

Mr. Harold Goodwin presented a framed engraving of John Vaughan, who had served the Society as Secretary in 1789 and 1790, as Treasurer from 1791 to 1841, and as Librarian from 1803 to 1842, and on motion the thanks of the Society were returned therefor.

The Society was adjourned by the presiding officer.

DIVISIONS OF NORTH AUSTRALIAN TRIBES.

BY R. H. MATHEWS, L.S.

(*Read May 5, 1899.*)

The division of a tribe into intermarrying sections or classes, although one of the most interesting of the institutions recognized among the Australian aborigines, has not hitherto received the attention which its importance deserves. In a former number of the PROCEEDINGS of this Society[1] I tabulated the names of eight sections, with the rules of marriage and descent in force over a large extent of country in the Northern Territory. Since then I have reported[2] a similar eight-section system, but with different sectional names, in the northwest corner of Queensland, extending southerly from the Gulf of Carpentaria for a distance of about three hundred miles, including the Wentworth, Nicholson, Gregory and Upper Georgina rivers.

In an article contributed to the Royal Society of New South Wales in June, 1898, I described the eight sections of the Arrinda tribe on the Finke, Todd and other rivers,[3] but, while that paper

[1] PROC. AMER. PHILOS. SOC., xxxvii, 151–154.

[2] *Journ. Roy. Soc. N. S. Wales*, xxxii, 251, 252.

[3] *Ibid.*, xxxii, 72.

was in the press, a correspondent furnished me with additional information which shows the line of descent in a manner that is more readily understood than by the table appended to the article in question. I propose, therefore, to supply a new table, showing how the divisions intermarry, with the sections to which the offspring belong, as follows:

TABLE I.

	Husband	*Wife*	*Offspring*
Group A.....	1. Panungka	Parulla	Pungata
	2. Mbutjana	Pungata	Ngala
	3. Knurraia	Ngala	Bultara
	4. Koomara	Bultara	Parulla
Group B.....	5. Parulla	Panungka	Koomara
	6. Bultara	Koomara	Knurraia
	7. Ngala	Knurraia	Mbutjana
	8. Pungata	Mbutjana	Panungka

It will be observed by the foregoing table that the sons of the women of one group marry the daughters of the women of the other; and, also, that each group has perpetual succession through its females. For example, take the women of Group A in the table, we find that Parulla is the mother of Pungata; Pungata of Ngala; Ngala of Bultara, and Bultara is the mother of Parulla, and this order of succession is continually repeated.[1] Among the women of Group B the line of descent conforms to the same rules. I have traced some of the section names of this organization, namely, Bultara, Koomara, etc., across the country from the Upper Finke river northeasterly to the Georgina river, a distance of more than four hundred miles.

My correspondent also made some further investigations respecting the order of succession in four of the sections of the Warramonga tribe[2] at Tennant's Creek, with the result that it becomes necessary to prepare an amended table of one of the groups. As it might cause confusion to show only one group, I have included both in the subjoined table:

[1] The names of the eight sections of the Upper Finke river tribes were first reported by the Rev. L. Schulze in 1891 (*Trans. Roy. Soc. S. Australia*, xiv, 223, 224.) Their arrangement into two intermarrying gronps was the result of my investigations (*Journ. Roy. Soc. N. S. Wales*, xxxii, 72).

[2] *Journ. Roy. Soc. N. S. Wales*, xxxii, 73.

TABLE II.

		Husband	*Wife*	*Offspring*
Group A.....	1.	Aponunga	Tungulli	Apungata
	2.	Ampajona	Apungata	Opalla
	3.	Ungary	Opalla	Kabajee
	4.	Akamarra	Kabajee	Tungulli
Group B.....	5.	Tungulli	Aponunga	Akamarra
	6.	Kabajee	Akamarra	Ungary
	7.	Opalla	Ungary	Ampajona
	8.	Apungata	Ampajona	Aponunga

In Group A of the above table, the rotation of the section names is different from that given in my former table, which, necessarily, alters the order of descent among the women and children. Group B is the same as that previously given. If my correspondent is now correct, it can be shown by this table that a brother's son's children intermarry with a sister's son's children, instead of the son of a brother marrying the daughter of a sister, and *vice versa*, as stated in my former paper.[1] In examining the two tables, I and II, it is seen that the names of several sections in the Arrinda tribe are almost identical with some of the section names of the Warramonga.

On the McArthur, Kangaroo and Calvert rivers, in the Northern Territory, reaching thence along the shore of the Gulf of Carpentaria beyond the Queensland boundary, and extending inland about one hundred miles, are several native tribes, among which may be mentioned the Yuckamurri, Yanular, Leanawa, Yookala and Kurrawar. The following synopsis shows the section to which a man belongs—the section into which he can marry—and the designation of the offspring:

TABLE III.

		Husband	*Wife*	*Offspring*
Group A.....	1.	Joolanjegoo	Jungalagoo	Bullaranjee
	2.	Jameragoo	Bullaranjee	Jooralagoo
	3.	Jinagoo	Jooralagoo	Bungaranjee
	4.	Yukamurra	Bungaranjee	Jungalagoo
Group B.....	5.	Jungalagoo	Joolanjegoo	Yukamurri
	6.	Bungaranjee	Yukamurra	Jinagoo
	7.	Jooralagoo	Jinagoo	Jameragoo
	8.	Bullaranjee	Jameragoo	Joolanjegoo

[1] *Journ. Roy. Soc. N. S. Wales*, xxxii, 74.

Some native tribes on the Victoria river, in the Northern Territory of South Australia are segregated into two intermarrying groups, with the following subdivisions:

TABLE IV.

	Husband	*Wife*	*Offspring*
Group A.....	1. Jamada	Jungalla	Dhalyerree
	2. Jameram	Dhalyerree	Joolam
	3. Janna	Joolam	Dhungarree
	4. Jummiunya	Dhungarree	Jungalla
Group B.....	5. Jungalla	Jamada	Jummiunya
	6. Dhungarree	Jummiunya	Janna
	7. Joolam	Janna	Jameram
	8. Dhalyerree	Jameram	Jamada

If we compare Tables I, II, III and IV with the table of eight sections reported by me in a former article to this Society,[1] it will be observed that the four tables are constructed on the same system, and all contain the same order of succession. In other words, all the tribes dealt with have substantially the same organization, although there are dialectic variations, more or less, in the names of the sections. In the Tables I, II and III, I have omitted the feminine form of the name of each section, which, it is thought, will enable the reader more readily to follow the rules of marriage and descent. The divisional system, or social organization, reported in this article, extends from the Upper Finke river to the embouchure of the McArthur, in the Gulf of Carpentaria, a distance of about six hundred and fifty miles. I am informed by some of my correspondents that the same system, but with different divisional names, reaches westwardly from the Gulf of Carpentaria to the Daly and Victoria rivers, and onwards into West Australia.

The southern portion of the Arrinda and adjoining tribes occupy the Middle Finke and Charlotte waters, reaching as far south as the Macumba river. Among them there are only four sections employed to regulate the intersexual relations, as shown in the following table. These sections comprise four of those enumerated in Table I:

[1] Proc. Amer. Philos. Soc., xxxvii, 152.

TABLE V.

		Husband	*Wife*	*Offspring*
GROUP A.....	1.	Panungka	Parulla	Bultara
	2.	Koomara	Bultara	Parulla
GROUP B.....	3.	Parulla	Panungka	Koomara
	4.	Bultara	Koomara	Panungka

It will be seen that the community is segregated into two intermarrying groups, and that the children take the name of the complementary section in the division to which their mother belongs.

In the southern portion of South Australia there are a number of tribes who possess the two primary groups only, like A and B in the foregoing tables, without any subdivisions into sections. As an example of this system, it may be mentioned that in some districts these two divisions, or groups, are called Matturri and Karraroo;[1] in others they are Krokee and Kumite; in other parts they are called Kookoojiba and Koocheebinga, and, again in others, they are known as Koolpirry and Thinewah. In each case the men belonging to one primary division marry the women of the other, and the children take the name of their mother's division. As I am now engaged in the preparation of a comprehensive article dealing with this type of organization, I shall not enter farther upon it at present.

ON AN INTERESTING FRAGMENT OF THE "BOOK OF THE DEAD."

BY RUDOLPH BUTI, PH.D.

(*Read May 5, 1899.*)

In the Egyptian collection of the Woman's College of Baltimore there is an Egyptian hieratic papyrus which, when handed to me for translation, I found to be an interesting fragment of the "Book of the Dead." The fragment written on papyrus is a foot and an inch in length and seven inches in width.

It contains a part of the 149th chapter, which is divided into fourteen paragraphs. The papyrus is also divided into vertical columns of three inches, separated by a double line of nearly one-

[1] *Journ. Roy. Soc. N. S. Wales*, xxxii, 69.

eighth of an inch. The top of each column is occupied for two and one-half inches by colored vignettes, relating to the subject of the paragraph.

The 149th chapter, to which the fragment belongs, is one of the highly mystical chapters, and, with the 148th, was to be recited on the festivals of the first, sixth and fifteenth days of the month, in order to let the deceased pass the mystical regions of Akar (a kind of Purgatory?) and to allow the soul to come out of them.

The entire 149th chapter contained fourteen parts or "abodes" of the Hades. In this papyrus we have the eleventh, twelfth, thirteenth and a portion of the fourteenth or last: but even the first three are not complete.

Almost all the vignettes have demons with swords in their hands. The first vignette (eleventh abode) contains a zigzag path, which is not a staircase as it appears for want of perspective, and two demons. One of them is female and lion-headed, with two swords; the other is male, a Cynocephalus God, also with two swords.

The following vignette (twelfth abode) contains a hippopotamus demon with axe-blade containing four swords.

The thirteenth abode contains the goddess Thaur or Thoueris, a concubine of Typho, the evil genius *Sĕpu*, with the features of hippopotamus and holding a scarabæus.

In the papyrus of Turin there is also a bareheaded god with bow and arrows; in its place are three horse-shoe-shaped abodes.

The last vignette is very much mutilated, but, with the help of the other rituals, we can reconstruct it. We have a crocodile, a hawk and an antropo-sphinx anubis, a Shes or tie God adoring, hawk again, befaced demon with swords, nit and horns.

According to the very regular writing of hieratic text, the colors of vignettes and the differences from other texts, we can say that this fragment belongs to the twenty-first dynasty, like one of those extracts made for religious purposes, preserved in the temples in order to be recited on the festivals of Uka or Thoth, the birthday of Osiris, the manifestations of Khem and the night of the hakr.

The first line of each column, containing the title of the paragraph, is written in red ink, all the others in black.

Although there are seventy-eight fragments of the "Book of the Dead" (of which twenty-five only in England and seventeen in

Paris), the Baltimore fragment is one of the few in America, and it is interesting on account of its fine handwriting and its completeness in the titles of different columns or paragraphs.

Besides that, in our fragment there are some variants worthy of note.

In the beginning of the eleventh abode we find a mention of "Osiris, Lord of Tattou" (Ȧusar neb Tattu . . .), which is never seen in the other texts.

All the phrases which in the Naville complete edition are erased are here clearly legible; even in the beginning of the twelfth abode, when in this fragment is written, "Osiris who opens the doors of heaven" (Ȧusar un ȧȧ pet . . .); in all other fragments this phrase is always wanting.

Equally, in the beginning of the last or fourteenth abode, the phrase, "Ammon in Thebes" (Ȧmen em Ȧptet), is not to be found in any other edition.

CALENDAR OF THE CORRESPONDENCE OF BRIGADIER-GENERAL GEORGE WEEDON, U. S. A., WITH CELEBRATED CHARACTERS OF THE AMERICAN REVOLUTION.

In the Library of the American Philosophical Society.

Prepared under the direction of the Committee on Historical Manuscripts.

(*Read May 5, 1899.*)

LETTERS TO GENERAL WEEDON.

Blair, Archibald:

1780.—*September 6. In Council.*—Proposition from Col. Robert Lawson to raise a body of volunteers to march to the southward, accepted. Detailed enumeration of conditions under which they shall serve. (Copy) No. 40.

1781.—*April 4. In Council.*—Extract from the minutes. Rule of exchange of prisoners to be adhered to as far as possible, calling for such citizens first as have been longest in captivity. If enemy think proper to liberate *absolutely* any number of captive citizens, an equal number of theirs shall be liberated. No. 75.

BLAND, THEODORICK:

1783.—*March 25. Philadelphia.*—Rejoicing over the declaration of peace. Our debt of gratitude to France.

P. S.—Commutation of five years' whole pay in lieu of half pay, allowed by Congress to officers of the army. No. 145.

DAVIS, WILLIAM:

1781.—*June 25. War Office.*—Wishes to know if arms sent arrived at Fredericksburg. Desires his assistance in getting boats for the Marquis, and also in meeting his demand for 600 arms. Dimensions and cost of boats. Congratulates him on the capture of Augusta with 160 British, 200 Tories and about 200 negroes, six pieces of cannon and various stores. On the 8th inst., Gen. Greene's approaches were within 50 yards of the enemy's works at Ninety-six. Offer of capitulation rejected. Reinforcements from Augusta hourly expected to join Gen. Greene. Enemy's only posts, Charlestown, Savannah and Monk's Corner. Georgetown evacuated. Will be in Charlottesville before he can receive an answer. No. 137.

DESBIGUES:

1781.—*June 6. Falmouth (in French).*—Asking for a permit to cross the river. Intends to debark at Leedstown for Cadiz to command the volunteers. No. 109.

ELWELL, JESSE:

1781.—*June 13. Prince William.*—Received orders from Gen. Nelson to send to camp every man of the militia who can be furnished with a rifle, and all horses except those employed in agriculture. Desires advice as to the carrying out of these orders. No. 121.

GRAHAM, RICHARD:

1781.—*June 14. Dumfries.*—Concerning the making of swords or sword hilts. Mr. Caves' offer to make 50 hilts if paid for them in tobacco. Desires his opinion on the intended movements of Cornwallis. No. 122.

GRAYSON, WILLIAM (Col.):

1780.—*October 23. Philadelphia.*—Encloses newspapers. Letter from Mr. Richard Harrison, at Cadiz, mentions destruction of

GRAYSON, WILLIAM (*continued*):

an English fleet of merchantmen. Col. Febiger's zeal in procuring clothes and tents attended with only moderate success. Afraid army will be distressed for woollen clothing and blankets. Will squeeze out about 500 suits for the Virginia line. Blames Virginia for not properly clothing her troops.

N. B.—Gen. Greene to command to the southward. Parsons promoted to rank as Major-General. Heath commands at West Point. No. 45.

1781.—*April 24. War Office.*—Warning him of the reported embarkation of Gen. Clinton for the southward with 3000 men. Believes they meditate immediate descent on Virginia to coöperate with Cornwallis for the conquest of that State and North Carolina. Has private intelligence that French fleet destined for America has not yet sailed. Wayne to set out in a day or two. Scarcity of cash the reason for his delay. Maryland dragoons in want of everything. Dutch have closed with Great Britain as to hostilities. Major Anderson of Virginia and several other officers exchanged by Gen. Moultrie. Cornwallis' threat to send all American officers to Jamaica.

P.S.—In future will not sign his name to any letter, as the British make a point of seizing post-riders and publishing the letters. No. 86.

1781.—*May 29. Philadelphia.*—Detailed account of arms ready to be sent on, and those in preparation. No money in Virginia to buy anything, and no credit. Wayne on his way to Fredericksburg. Six hundred new levies expected from Maryland and Delaware. With Moylan's horse and Steuben's 1200 cannot Cornwallis be faced? Evacuation of New York not so improbable. Conjectures concerning the destination of the last detachments from New York. Advices from Europe most hopeful. No. 95.

1781.—*June 5. Philadelphia.*—Desires more particular intelligence concerning the Marquis' whereabouts, and the number of his (Gen. Weedon's) own force. By July 1, there will be sufficient arms in Virginia for every purpose. Three battalions of militia ordered from Maryland and four from Pennsylvania. Incloses list of arms sent on. Will send by every post further

GRAYSON, WILLIAM (*continued*):

details. Will push hard to get leave to go to Virginia, after arranging matter of arms. No. 106.

1781.—*June 5. Philadelphia.*—Asking that an officer may be sent to Noland's Ferry, who shall remain until July 1, to direct the waggoners where to take the arms. No. 108.

1781.—*June 12. Philadelphia.* — Acknowledging letter of 5th inst. List of arms sent. Upwards of 200 muskets repaired daily. Swords and pistols not so numerous, but promises a certain number. Has informed the Marquis of these matters and has suggested the propriety of collecting and stationing a body of volunteers at Leesburgh. Heard that the Duc de Lauzun's corps were at Lebanon, but uncertain whether their destination is Virginia. Advises skirmishes, but no general action. No. 120.

1781.—*June 18. Philadelphia.*—Acknowledging letter, and glad to hear that matters are not so desperate. Fears the Marquis will risk a battle. Great superiority of the enemy's cavalry. Mentions various reinforcements if only the Marquis will wait for them. Assembly of Pennsylvania doing nothing, still debating the advisability of sending troops to Virginia's aid. Convulsed by faction and ruled by Republican party. President of the State desires the measure, and also the command of the troops, if they march. News of arrival of ships at Boston containing 1200 recruits and military stores for French army at Rhode Island. Also news too good to be true of the arrival in Boston of the Alliance and Lafayette with food and clothing. Difficulty in getting waggoners to carry the arms, several of them having been taken by the enemy. No. 129.

1781.—*June 26. Philadelphia.*—Clothing and 200,000 cartridges despatched to the Marquis, also arms, which were repaired. Moylan will leave Lancaster in two days with 60 dragoons well accoutred. Arrival of Capt. Barry at Boston in the Alliance. Parted, at sea in a gale, with the Lafayette, containing all the arms and clothing. Safety of this vessel of more importance than three victories. Pennsylvania doing well. Reasons for thinking Gen. Weedon ought not to join the Marquis. Desires his opinion of rampart arms. List of arms ordered. No. 140.

GREENE, NATHANAEL (Gen.):

1777.—*February 24. Basking Ridge, N. Y.*—Acknowledging letter of 23d inst. Ignorant who gave Col. Guyger orders to come to his department, but will arm them. Col. Piper's detachment to join Gen. Putnam. Attack made on foraging party of enemy, from Amboy, 4000 strong. Enumerates casualties on both sides. Col. Johnson, with party of Maryland militia, attacked enemy, but, just as they were in his power, his party cowardly deserted him. Will send prisoners, taken by Gen. Warner, to Morristown.

N. B.—Enemy killed two of the inhabitants because they did not assist them to carry off their dead. No. 2.

1782.—*April 22. Headquarters near Dorchester.*—First part of letter personal and amusing. In latter part, speaks of ragged and destitute condition of the army. Complaints of officers and men. Not a good condition in which to face a superior enemy. Not a drop of spirits in camp. No. 142.

1782.—*October 1. Headquarters.*—Congratulations on the approaching peace. Evacuation of Savannah and Charleston, old news. Refugees embarking for St. Augustine—no greater punishment. Their situation there deplorable: no shelter, no food. Resentment of people too strong to admit pity. Expects whole British army to be gone by the 12th or 15th. His work being completed, hopes to go North. Took pride in getting rid of enemy without foreign aid. Prospects flattering, but vigilance still needed. Meeting of officers to be held in January to learn their wishes in respect to returning from, or continuing in, service. For himself, desires, above everything, to be a private citizen. Particulars about Col. Washington's and Lt. Col. Lee's marriage. Remembrances to friends. No. 143.

HENDRICKS, JAMES (Col.):

1781.—*May 15.—Alexandria.*—Reporting unnecessary delay in the carrying of a letter from the Marquis to Gen. Wayne. Desires the matter to be looked into and the delinquent punished. No. 93.

1781.—*June 19. Alexandria.*—Acknowledging letter of 17th inst. Capt. Moore, commanding Volunteer Light Horse at

HENDRICKS, JAMES (*continued*):

Georgetown, does not think he is justified in moving without the Governor's instructions. Such punctilios a pity. Hears the Executive of Maryland has never been called on, officially, for her aid; if true, wishes the Marquis would call on them. Can find no shoes in town. Must get County Commissioner's assistance to procure vinegar and spirits. Will do all in his power. No. 133.

HOLMES, JOSEPH:

1781.—*June 5. Winchester.*—Acknowledging letter of 2d inst., concerning the guarding of prisoners. Renders account of the prisoners, their number and rank. No. 105.

JEFFERSON, THOMAS:

No date.—Executive will impress necessary boats. Light boats being built but not to be depended on. No. 30.

1780.—*July 28. Richmond.*—Asks for duplicate certificates, setting forth at what time the regiments were taken on the Continental establishment, whether armed by the State, and how many arms they carried. No. 32.

1780.—*October 22. Richmond.*—Received this day certain information of the arrival of a considerable fleet of the enemy in the bay, and of their intended debarkation. Measures taken to oppose them. His (Gen. Weedon's) presence needed to aid in the command, also Gen. Muhlenberg's, Gen. Nelson's and Gen. Stevan's. No. 43.

1780.—*November 3. Richmond.*—State of magazine renders it essential that not a single arm shall be lost. No militia man who has received a public arm shall be discharged from duty until he has returned it, or given a satisfactory account of it. If he omits to do this, he shall be declared a deserter. No. 52.

1780.—*November 6. In Council.*—Every kind of necessary in future to be impressed according to the directions of the invasion law. One hundred copies of this clause to be printed. The State Quartermaster directed to spare to Mr. Southall two of the three wagons he has. Question as to who has the right of appointing the surgeon and the surgeon's mate. Encloses £125 new money, only kind issued from the treasury, equal to

JEFFERSON, THOMAS (*continued*):

£5000 old money. Offers any aid in their power to promote operations in the laboratory. No. 55.

1780.—*November 7. In Council.*—Encloses Militia Commission to Mr. Triplett, to enable him legally to impress provisions and necessaries. No. 56.

1781.—*March 31. In Council.*—Statement of the number of militia needed to relieve those first called upon. Discusses speediest way of obtaining reinforcements. Master Alexander Frazier Gregory to be permitted to land and proceed to Urbana, on account of services rendered Gen. Woodford by his father. Encloses letters to be delivered to the Flag vessel in James river. No. 64.

1781.—*April 3. In Council.*—Desiring him to see that the militia, ordered to relieve those long in service, proceed to Gen. Muhlenberg's headquarters. Part of Gen. Muhlenberg's forces, having been three months from home, are very impatient. Thinks it wise not to hazard his (Weedon's) detachments more than is necessary. Scouring parties still keep up spirits of the people, protect them from depredation, and, if withdrawn of nights, will, perhaps, be safe. Disposition of vessels containing stores.

P. S.—Very particular attention to be paid to the returning of public arms and ammunition. No. 72.

1781.—*April 4. In Council.*—Acknowledging letters of 1st, 2d, 3d inst. Impossible to send additional arms at present. Any men from the counties destined for the present tour, who cannot be armed, may be sent to Gen. Muhlenberg, whose riflemen will not stay until reliefs arrive. Encloses resolution of Council concerning exchange of prisoners under general rules, the advantage of which will result equally to the lowest and highest citizen. Right of turn an insuperable obstacle to every proposition for the exchange of Col. Curle. Desires Col. Curle's enlargement may be obtained on such a parole as a man of honor could sign. Our kindness to captive English officers should render refusal difficult. Encloses list of prisoners for exchange, soldier for soldier, sailor for sailor, etc. No. 73.

JEFFERSON, THOMAS (*continued*):

1781.—*April 23. Richmond.*—Inclosing letter forwarded by Baron Steuben. Anxious to know if it is an answer to proposition for exchange of prisoners. On 18th enemy came from Portsmouth up James river, force unknown. Landed in two bodies; one at Burwell's Ferry, the other near the mouth of Chickahominy river. Upper party proceeded to shipyard. What injury they did unknown. Stores eight or ten miles higher up. On 22d, enemy left Williamsburg; their future movements doubtful. Enumerates counties from which all men able to bear arms are ordered to assemble at Petersburg. No. 85.

JENIFER, DANIEL, OF ST. THOMAS:

1781.—*June 5. Philadelphia.* — Meeting of foreign powers. Thinks France will procure us favorable terms, if not from justice then from policy. Trusts the Marquis will check Cornwallis. Grayson indefatigable in procuring arms. Four battalions likely to be sent at once to the aid of Maryland or Virginia. Advantage to Pennsylvania if she had delayed a little longer the selling of British property. No. 107.

JONES, JAMES:

1781.—*June 17. Bowling Green.*—Announcing his advance to join the Marquis with a troop of volunteer horse raised in Gloucester county. Ignorance of the enemy's whereabouts and terrible condition of his horse's hoofs determined his march to Fredericksburg. No. 125.

LAFAYETTE, MARQUIS DE:

1781.—*April 27. Bowling Green.*—From information received, thinks enemy has landed, near 3000 strong, and taken Petersburg. Intends leaving for Richmond on the following morning. Small force of horse or men necessary to the Governor's safety and his own in Richmond. Arrival of artillery under Galvan of the utmost importance. Requests him to give Galvan any militia and mounted men he can collect. Must be pushed on night and day. Importance of keeping Richmond. No. 92.

1781.—*May 28. Hanover county.* — Public stores and much private property having been removed from Richmond. A

LaFayette, Marquis de (*continued*):

defeat at present is not worth risking. Road from Hanover Court house to Richmond being unsafe, will remove to Allen's Ford, south of Anne river. Requests that the militia and the expresses shall be ordered to that ford. Also that a strong force may convey thither the horses, arms and particularly clothing coming from Baltimore and Philadelphia. Enclosed to be forwarded to Gen. Wayne. Leslie reported to have gone down James river to garrison Portsmouth. Wants riflemen, cavalry and arms. Thanks him for his past exertions. No. 94.

1781.—*May 29. Gold Mine Creek.*—Enemy's present plan to march to Fredericksburg; hopes to arrive before the main body. Will be at Anderson bridge the following day at noon. Desires everything to be sent there. Desperate need for dragoons. Enclosed to be sent post-haste to Gen. Wayne. All stores to be moved out of harm's way. Every boat and bridge below the falls to be immediately destroyed. The great want of horses and saddles. Desires him to acquaint the General's mother and also Mrs. Washington with this news, also any others who mean to move. No. 96.

1781.—*June 2. Davenport Tavern.*—Enemy's intention to turn his right flank and prevent his junction with Gen. Wayne. Will move towards Orange Court house, at which place militia must rendezvous, and expresses be sent there. Orders concerning supplies on hand and those on the road.

P. S.—Even bet that the enemy will go straight to Fredericksburg. Leslie and Arnold gone down already with body of troops. No. 99.

1781.—*June 2. Mattapony Church.*—(Written by G. A. Washington, aide-de-camp of LaFayette.) Removal of public stores should proceed. Precautions for his (Gen. Weedon's) safety must be taken, as the main body of the enemy are at Chesterfield, and will probably be in Fredericksburg on the following day. Begs him to acquaint Gen. Wayne with the situation, and to write the commissary of prisons, to hold prisoners in Winchester ready at a moment's warning. On arrival of enemy, destruction of boats must be particularly attended to. No. 100.

LaFayette, Marquis de (*continued*):

1781.—*June 3. Corbin's Bridge.*—Orders concerning the sending forward of the militia, the mails and the stores. No. 103.

1781.—*June 16. Deep Creek.*—Mr. Brown is the bearer of this letter. Enemy moving towards Richmond, followed by him (LaFayette), but difference of ground makes reinforcements an immediate necessity. Desires above all things, cavalry. Directions as to their reaching him at once. Wants all armed and unarmed militia, not belonging to counties north of Rappahannock, to be hurried on to him with the greatest despatch. The terrible need of cartridges and shoes, also rum, for the water is bad. Importance of these things! They must travel night and day. No. 123.

Lee, Richard Henry:

1781.—*June 1.*—Acknowledging letter of previous day concerning the raising of militia in the four lower countries. Westmoreland Court house an excellent rendezvous. Certain that Cornwallis will not come north until English fleet appears in the Potomac. Conjectures concerning the slowness of their advance. Terrible want of all things: arms, cavalry, ammunition, etc. Trusts Gen. Wayne will join him (the Marquis) in a day or two, and that together they will make head against the enemy's divided force. No. 97.

1781.—*June 2. 9 o'clock, Saturday.*—Acknowledging letter of previous day. Will submit it to the Lieutenant of Richmond to be forwarded. Will call out militia and armed men to the number of 200 or 250. Enemy's councils now directed by plunder and revenge. No. 98.

1781.—*June 7.*—Detailed account of the drafting of militia. Two hundred well-armed men will join him at Falmouth, under command of Col. John A. Washington. May expect 500 men from the four lower counties. Enemy's designs in the Rappahannock and Potomac. Fears they cannot be prevented from plundering and burning, since so many men and officers have been detached. Will deliver his letter to Col. Warrington. No. 110.

1781.—*June 25. Westmoreland.*—Informing him that one-half of the Westmoreland militia are ordered to march on the following day. Recommends the bearer, Mr. John Munroe, to his

LEE, RICHARD HENRY (*continued*):

kind attention and begs his influence in procuring him a position in the army, more worthy of his past service. No. 139.

1781.—*July 1. Chantilly.*—Acknowledging his last letter. Lookouts vigilant and on the alert for any sign of hostile fleet. Enclosed letter from the Marquis tells condition of affairs three days before. Reported that Mr. Jenifer of Congress has written to his brother of the evacuation of New York by the enemy. If true, either the southern war will be pushed vigorously, or else they intend to quit the states. Wants powder, cartridge paper and a few arms. No. 147.

MCHENRY, JAMES:

1781.—*June 25. Mr. Savage's House.*—Enemy lay at New Kent Courthouse, from 21st to 24th. This morning, Pennsylvanians moved on the route of his lordship. Militia continue on this ground. Marquis begs that a special messenger be despatched to Annapolis to the officer commanding Moylan's corps. No. 138.

1781.—*June 29. Tyree's Plantation, Twenty Miles from Williamsburg.*—Short account of an action on the 26th between American advanced corps under Cols. Butler and Simcoe, within six miles of Williamsburg. American loss: five officers, two sergeants and twenty-six privates killed and wounded. Enemy had sixty killed and one hundred wounded. Lord Cornwallis in Williamsburg; has received reinforcements from Portsmouth; is shipping off his negroes at York. No. 141.

MCWILLIAMS, WILLIAM:

1781.—*June 20. Camp, Dandridge's Farm.*—Glad to place certain men in the important business of making accoutrements for the soldiery. Gen. Greene's success in Carolina. All the enemy's posts taken, except Charlestown, besides 20,000 bushels of corn, sixteen pieces of cannon, and 500 British prisoners. Enemy have crossed James river at Richmond, after destroying tobacco warehouses and some private property. Apologizes for any inaccuracy on the plea of the scarcity of paper. No. 135.

MEALS, JOHN:

1780.—*October 30. Long Island.*—Bearer of this letter is Capt. Willis, who has been exchanged. Speaks of himself as a prisoner with small hope of liberation. Solicits Gen. Weedon's influence with those in power to procure him a parole. Question of certain rents being due. No. 17.

MERCER, JOHN F.:

1783.—*March 24. Philadelphia.*—Negotiations in Europe happily terminated in a general pacification. Triumph, a French frigate, despatched by LaFayette and Comte d' Estaing, brought the news of the cessation of hostilities. Late confusion in the army terminated in a manner which reflects additional honor on that band of patriots. Results of a slight alteration in the southern boundary. No. 144.

MORTIMER, CHARLES:

1780.—*October 30. Fredericksburg.*—Has sent one hundred weight bark, as requested. Urgent need of medicines for his hospital. Keeps the few medicines he has for private practice. Has sent forward seven or eight patients. None shall be kept that can do duty in field or garrison. No. 18.

MUHLENBERG, GENERAL:

1780.—*September 5. Fredericksburg.*—Wishes to know whether it would not be wiser to keep sufficient arms for the levies that rendezvous at Winchester, Alexandria and Fredericksburg. Encloses returns of arms sent forward and those left behind. As soon as he can make up an officer's command with the deserters brought in, will attend to Gen. Weedon's letter of the 29th inst. No. 39.

1780.—*October 8. Richmond.*—Express arrived an hour before from Gen. Gates with an account that Lord Cornwallis had been reinforced with 1000 men, that the enemy were in motion and had taken Charlotte. Begs for four wagons to enable him to send reinforcements to the General. No. 42.

1780.—*October 22. Richmond.*—Sunday night. Amazingly distressed for want of officers. Wishes every officer from Fredericksburg sent on, also Dr. Wallace, as he needs a surgeon. No. 44.

MUHLENBERG, GEN. (*continued*):

1780.—*October 27. Petersburg.*—Glad to hear of his (Weedon's) arrival at Richmond. Advice as to the arrangement of the new levies. Col. Bufort's letter reports that Col. Campbell, in a late action with part of Fulton's corps, killed seventy of them. Making preparations to march for Cabbin Point. Has ordered London Volunteers to join ninety of Gibson's Regiment. No. 47.

1780.—*October 28. Cabbin Point.*—Arrived at Cabbin Point this morning. Nettled to hear that the English had reimbarked and hauled off into the bay without having a shot fired at them. A British cavalryman, captured, swears he left British troops, two nights before, marching towards Smithfield, and that the forces employed in this invasion number 8000. Believes he lies, but will march the next morning and convince himself. What can he do without cavalry or cannon? Has 140 men without camp-kettles; also companies of 100 men with only one officer. No. 49.

1780.—*October 29. Cabbin Point.*—Favor of 27th at hand. Prisoner's assertions of yesterday confirmed. Enemy about eight miles from Smithfield. Would be there, himself, if he could have procured provisions. Money necessary to get military departments in order.

P. S.—Hears that enemy encamped two nights before at Joseph Scott's, seven miles above Suffolk. No. 50.

1780.—*October 31. Baker's Mills, Isle of Wight.*—Militia, 100 in number, assembled at Cabbin Point, only four muskets among them. Must refer them to him (Weedon) for arms. Has sent out 300 men after a plundering party. Hopes to gain from them a few prisoners to furnish him with proper intelligence. Expects Gen. Nelson in the evening. No. 20.

1780.—*October 31. Col. Allen Cockes.*—The bearer of this, Mr. Bush, can give all the intelligence procured thus far. If possible, will form a junction with Col. Parker, before night, who has 250 men. Will endeavor to surprise enemy's outposts. In great need of horse for reconnoitering purposes. No. 22.

1780.—*November 5.*—Encloses letter for the Governor. Reinforcements received, so trifling that he is obliged to stand aloof and not venture further. Difficulties of his position, the enemy

MUHLENBERG, GEN. (*continued*):

having destroyed all boats. Force of enemy too large to permit of his attacking them. Capt. Gaines with small body of horse surprised the advance picket. Officer of the guard, a Hessian, lost his life through speaking English imperfectly. Any chance of getting arms for militia?

P. S.—Twenty-two bushels of oysters just arrived. No. 51.

1780.—*November 5. Stoners Mills.*—Since writing has received enclosed letters from Gen. Gregory and Col. Lamb. Enemy's present manœuvres make reinforcements at this post absolutely necessary. Advises Gen. Weedon if he moves down to take the nearest route to Stoners Mills. Flag just got to Smithfield from Portsmouth, with letter from Mr. Blair on a very frivolous errand. Intends writing to Gen. Leslie to send flag only when there is something worth communicating. [No. 54.

1780.—*November 11. Stoners Mills.*—Just received his favor by express; glad to hear that he is coming on. Enemy lie still from choice, while he does it from necessity. Has a plan to surprise the enemy's post at Dr. Hall's, but will put it off until Gen. Weedon's arrival. Ship-carpenters not needed at his post. Expects Gen. Weedon and Gen. Nelson to supper Monday evening, "hail, rain or snow." No. 58.

1781.—*April 6. Camp near Scott's.*—Acknowledging letter of the 4th. Sent Gen. Phillips's letter, regarding exchange of prisoners, to the Baron. Enemy's designs uncertain. Thinks their main object a junction with Cornwallis, by which route time only will discover. Two deserters from Portsmouth insist that Gen. Phillips has only two regiments. Advantages of his own position; description of the distribution of his forces. No. 77.

1784.—*February 15. Philadelphia.*—Acknowledging favors of 10th and 18th of January. Never received letter enclosing Act of Assembly. Inconvenience of having to set out at once at such short notice for the meeting at Louisville. Instructions concerning personal money matters in case he fails to return from this expedition. Laments the selling of Gen. Weedon's lands and the consequent end of their fishing together. The effect on Mrs. Muhlenberg. Would like to send by post some new books, but it costs too much. Baron Steuben hard at work. No. 150.

MUHLENBERG, GEN. (*continued*):

1786.—*July 18. Philadelphia.*—Delay in getting letter of May 29th. Prize money cannot be drawn unless tickets are presented. Sends bundle of newspapers and the anniversary oration, delivered by Major Jackson before the Society of Cincinnati. The purchase by him and the vice-president of the famous Big Spring tract in Berks Co., Pennsylvania. A description of its advantages. (Note on back of MSS., dated October 12.) Speaks of letter on other side, dated three months before. No time since to write. No. 151.

NELSON, THOMAS.

1777.—*October 28. Williamsburg.*—Wishes to know if report is true that Burgoyne has really surrendered. If true, will not independence be immediately established? Attack on Fort Mifflin, having failed again, their momentary possession of Philadelphia will avail them little. His (Nelson's) sympathy with the army, but his strong wish to raise a body of men, not thought proper at this time. Promises to do it in the future. The Assembly appointed to meet nine days before, has not yet made a House. Terrible remissness at such a critical time. Fears the enemy will hear of it. Nine ships of war in Hampton Roads; their object, perhaps, an attack on Portsmouth. Enemy in want of water. Trusts they will not be able to relieve their distress in Virginia. No. 7.

1777.—*December 19. Williamsburg.*—Acknowledging favor of 27th inst. Letters from York report that Gen. Howe has marched to Chestnut Hill with entire force and an engagement hourly expected. Wishes a general battle could be avoided. Condition of our men compares unfavorably with the enemy's. Also, a defeat on our side might prevent France from declaring war on England. Bill, brought into the House by him, to raise 5000 men to serve six months, thrown out. Might interfere with completing the regular battalions. No. 10.

1780.—*November 3. Williamsburg.*—Acknowledging letters delivered by Captains Prosser and Kirkpatrick. Difficulty of arranging militia when they arrive in such small detachments. One regiment under Col. William Nelson will take their station below York; he needs a Lieut.-Colonel and a Major. Will form light corps for Captain Kirkpatrick as requested.

NELSON, THOMAS (*continued*):

Getting together flat-bottomed boats. In great need of arms, also of men to repair them. Enemy prevented his crossing the river to meet Muhlenberg. No. 29.

1780.—*November 4. Williamsburg.*—Orders just issued to bring boats at the shipyard to Burwell's Ferry. Before receiving his letter of 2d inst., had sent two detachments of horse to Gen. Muhlenberg, and a third will follow. Col. Southall with part of his troops is around Hampton, sent thither as a man of discretion to prevent any intercourse between the enemy and the inhabitants. Thinks he ought to stay there, but, if necessary, will send him to join Gen. Muhlenberg. Medicine needed. No. 53.

1780.—*November 22. Rich Neck.*—Acknowledging letter of the 19th. Does not understand why English fleet remains in Hampton Roads. They have an idea that his (Nelson's) force is 3000 strong. Several negroes have joined the English. Prospect of a glorious ending to the campaign. Detached condition of his brigade. No. 59.

1781.—*June 18. Leeds.*—Informing him that he has sent up six prisoners under guard. Incloses proceedings of a general court-martial held for their trial. Necessity of guarding them closely. Incloses also general return and copy of circular letter to the county-lieutenants of Northumberland and Lancaster, on back of which is a copy of orders to the officers commanding two companies for the defence of Westmoreland and Richmond. His present command the most pleasant in all his military experience. Forming legions of Westmoreland and Richmond, in order to furlough the rest of his command. Question of cavalry. No. 131.

1781.—*June 19. Leeds.*—Concerning the trial of some "vile rascals." Happy effects produced by this tribunal. When it is over will send prisoners under guard to him to be forwarded to their respective destinations with statements of their crimes and the sentence of the court martial. More about the granting of furloughs. Begs permission to go and assist his family who are without food, raiment or lodging. Complains of never receiving a line from any militia officer. Houses burned by enemy. Robberies committed by enemy's privateers since

NELSON, THOMAS (*continued*):

the flag vessel went up to Alexandria; this matter ought to be looked into. No. 132.

1781.—*July 2. Charlottesville.*—Indisposition prevented his answering despatches before. Thanks him for his vigilance and activity in apprehending tories on the borders of the Rappahannock. Desires some intelligence respecting the disaffected. Montague's being tried by a court-martial may bring matters to light. Other measures which might be taken. No. 148.

PAGE, MANN:

1777.—*April 22. Philadelphia.*—Mrs. Page's illness prevented an earlier reply. Best Generals think the enemy's principal attack will be against this place. On Sunday, 13th inst, nine of their men-of-war came into this bay. Camp ordered by Congress to be formed under Gen. Schuyler on west side of Delaware. Enumerates the reasons for it. Gen. Washington approves in part, and ordered camp to be formed at Bristol. Enemy anxious to obstruct trade of Philadelphia. Their army mouldering away with sickness. On 14th Gen. Steven surprised enemy's pickets, killed seven and took sixteen prisoners.

P.S.—Surgeon has gone to Dumfries to inoculate southern troops. No. 4.

PARKER, (Col.):

1777.—*January 24. Springfield.*—Detailed account of a fight on the road leading from Brunswick landing to Woodbridge. Col. Parker's superior officer, Col. Buckner, left on horseback as soon as firing began, and riding four miles to his quarters, announced that all was lost. By this desertion Col. Parker was forced to draw off his troops, none being wounded and only two taken. English loss nearly one hundred killed and wounded. Charges Col. Buckner with cowardice. No. 1.

PRYOR, MAJOR:

1781.—*April 9. Richmond.*—Agreeable to request, has procured a proper vessel as a floating magazine, to be stationed at Sandy Point. Promises shortly to supply a sufficient quantity of ammunition. No. 82.

STEUBEN, BARON:

1780.—*November 23. Richmond.*—His letter of the 19th to Gen. Greene, arriving too late, was delivered to him (Steuben). Desires to see Gen. Weedon and have his advice and assistance in arranging the military department. No. 60.

1781.—*March 21. Suffolk.*—Instructions to march with the troops under his command to York, to cover the battery at that place. Troops at Halfway House to remain there. All boats collected in College Creek to go immediately into Chickahominy river. Vessels to go as high up James river as possible. No. 62.

1781.—*April 1. Chesterfield.*—Rejection of his proposals by the Government. Prospect of accelerating departure of new levies by no means flattering. Gen. Greene very pressing to have cavalry completed; at a loss how it's to be done. Had enemy chosen to disembark all their forces, and make a descent on north side of river, very little resistance could have been made. Believes however that the enemy intend rather to carry most of their force round to the support of Cornwallis. Fears for Gen. Greene, and also for French troops in the fleet. Recommends him to keep up correspondence with Gen. Muhlenberg. Desires immediate information of whatever passes. No. 66.

1781.—*April 11. Richmond.*—Acknowledging letter of 10th inst. Gives his reasons for not ordering back the militia. Gen. Weedon's presence, however, needed there at once. News of the arrival at Fredericksburg of four field pieces and ammunition, conveyed by a detachment of Maryland troops under Col. Stewart. These together with Gen. Weedon's forces should prevent any considerable damage. Desires some word as to his movements and those of the enemy. No. 84.

THORNTON, (Col.):

1781.—*June 3.*—Enemy began their retreat at 4 o'clock this morning from Stells. Left two of their men hanging on a tree and several negroes with the small pox. Desires this intelligence to be sent to the Marquis. Wishes to know where Wayne is. No. 102.

WALKER, JOHN:

1780.—*October 24. Philadelphia.*—Acknowledging favor of the 10th inst. Defeat of Ferguson encouraging. In a few days Col's Meade and Harrison will arrive in Virginia with all the news. Hopes to write him from Fredericksburg about the middle of November. Gen. Greene to take command of southern department.

P.S.—News just received of the capture of about 50 of the British East and West India fleets by the French and Spanish fleets off Cape Finistere. No. 46.

WASHINGTON, GEORGE, (General):

1777.—*March 27. Morristown.*—Acknowledging letter of 10th inst. Question of the promotion of Captains Washington and Thornton. Hopes Thornton will exert himself to the utmost to facilitate the recruiting of Thruston's regiment, as the latter's wound keeps him quiet. No sign of the recovered soldiers of the 3d regiment. Negligence and disobedience of officers must be remedied by strong measures. Indignant at the idea of a leave of absence for himself or his officers at such an important point in the campaign. Cannot consent to Gen. Weedon's being longer from the army than May 10th. Orders all officers of the Virginia troops, with certain exceptions, to join the army at once.

P.S.—Vessels with war stores arrived at Boston from France. Two prizes just taken, in the harbor also. No. 3.

1777.—*May 26. Morristown.*—Obligatory instructions concerning the army. Every soldier, with certain exceptions, to join his corps immediately. Each regiment in his (Weedon's) brigade to be completed to the establishment. Return of the brigade to be rendered every Monday. Find out cause of frequent desertions; call rolls regularly; no furloughs to be granted except in cases of extreme necessity. Careful supervision of the men's accoutrements, food, etc. Accept no resignation of a commissioned officer. What to do in case of a vacancy. Make up and deposit pay rolls in the hands of the Paymaster-General. Avoid heavy baggage on the march. Unless soldiers are sick or lame do not let them throw their arms or packs into wagons. Discourage vice and immorality

WASHINGTON, GENERAL (*continued*):

and gambling. Encourage attendance at Divine worship and amusements. No. 5.

1777.—*October 26. Headquarters.*—Council of war to be shortly called. Desires Gen. Weedon to state his sentiments on the eight questions which follow concerning the plans and welfare of the army. No. 6.

1777.—*December 3. Headquarters.*—Wishes to know by the morning his sentiments on the advisability of a winter's campaign and the practicability of an attack upon Philadelphia with the aid of a considerable body of militia. No. 9.

1783.—*October 24. Rocky Hill.*—Concerning the establishment of the Society of the Cincinnati in each of the southern States. The choice of President-General falling on himself and his duty being to name the place for the general meeting, he must know in which States the Society is established. Desires to know if it has taken place in Gen. Weedon's State. No. 149.

WASHINGTON, JOHN A.:

1781.—*June 9. Major Nelson's, near Price's Ordinary.*—Ship sighted off Blackstone is supposed to be a flag-ship with necessaries for the convention prisoners. Has heard that a considerable fleet of the enemy's ships were at Gwynne's Island; no official account. If able to leave will wait upon him (Weedon) at his headquarters. Number of 1st division short of his expectation. No. 115.

1781.—*June 18. Mont Clear, Westmoreland Co.*—Reasons for his not visiting him (Gen. Weedon). While at Leeds heard that Major Mercer's horse with some infantry had captured some of the enemy's horse, but lost 12 men. Anxious to know the details of the affair, as his son Bushrod was one of the Major's volunteers. Col. Nelson holding a court-martial on several tories; sentence not published when he left Leeds. Believes enemy's vessels to be at mouth of river. Glad militia of certain counties are discharged, as his overseer, who is among them, is sorely needed on his estate.

N.B.—Apologizes for troubling him with enclosures for conveyance. No. 130.

UNKNOWN CORRESPONDENT:

No date.—Giving intelligence of the enemy's forces. Their crossing from Portsmouth to Norfolk 2500 or 3000 strong. Rumored that they are making a push to join Cornwallis.

No. 153.

LETTERS FROM GENERAL WEEDON.

BLACKBURN, (Col.):

1781.—*June 8. Camp, Hunter's Heights.*—Situation of the Marquis LaFayette calls for the aid of every available horse. Lord Cornwallis pointing towards stores in the Southern Communication and the Marquis intending to hang on his rear until reinforced by cavalry and infantry. No. 113.

COMMANDING OFFICER IN BERKLEY:

1780.—*January 21. Falmouth.*—Has been necessary to reinforce the lower counties with 500 of his (Weedon's) best men. Enemy marching in force to Smithfield. Requests him to send two companies of good men by the shortest route.

No. 31.

COOKE, (Major):

1780.—*October 31. Richmond.*—An order to guard small fleet of boats at Hoods, stationed there to transport troops. Utmost care wanted to keep boats in constant readiness. Large smoke on shore, the signal for them to come over. No. 23.

COUNCIL OF VIRGINIA:

1781.—*April 6. Williamsburg.*—Has sent a detachment to cooperate with militia for the protection of Virginia's defenceless counties. Does not wish to draw the farmers and planters into the field in force, but merely to prepare them to act on the shortest notice. Alarm posts and signals to be arranged and arms and ammunition to be ready for immediate service.

No. 76.

DAVENPORT, (Capt.):

1781.—*April 8. Williamsburg.*—Acknowledging letter received that day. Sorry for fate of the Patriot, the result of the disobedience of Capt. Chandler, who was positively forbidden to risk an action. Unless his request to the county-lieutenant

DAVENPORT, CAPT. (*continued*):

for Warwick and Elizabeth City, to detach a body to join Captains Kelly and Davenport, is obeyed, will remove the troops and leave defence of the country to more able officers. Directing him (Davenport) to command the horse and Capt. Kelly the infantry, and both to act in conjunction as his executive officers, regardless of nice punctilios; also, to act on the defensive and keep him fully informed of every transaction. No. 81.

DAVIS, WILLIAM (Col.):

1780.—*November 23.*—Begging him to forward tents to Gen. Muhlenberg, who is sadly in need of them. Has given militia at Cabbin's Point an order on the Commissary of military stores at Chesterfield for arms. Requesting him (Davis) to send forward such of his militia as are arranged; arms and tents to be given them at Chesterfield, if not provided at Richmond. Hoping to join Gen. Muhlenberg before night. No. 61.

FEBIGER (Col.):

1780.—*August 31. Fredericksburg.*—Orders to him and Capt. Lovely to meet and make a survey of provisions and stores; reporting the quantity fit for use. The report, signed by six gentlemen. No. 38.

GATES (Gen.):

1780.—*September 16. Fredericksburg.*—Will forward shortly the 1000 camp-kettles ordered from Mr. James Hunter. Regrets exceedingly the misfortune near Camden. Second division of the fleet not yet arrived; said to be blocked up at Brest by a British fleet of thirty-two sail. No. 41.

1780.—*November 2.*—Arrangements being made to repel invading foe, who now occupy ground from Portsmouth to Suffolk. Encloses intelligence, gained from a prisoner, respecting enemy's strength, which, though small, cannot be attacked until militia is assembled, officered and armed. Gen. Muhlenberg, with 800 new levies and 80 old soldiers, has passed down James river; hopes he will stop enemy's depredations. Gen. Nelson forming militia at Williamsburg. Three hundred Marylanders to reinforce Gen. Gates' army. Intention of English to cover Lord Cornwallis's operations through North Carolina. No. 26.

GRAHAM, RICHARD:

1781.—*June 17. Fredericksburg.*—Acknowledging letter of 14th inst., and thanking him for procuring the hilts. Marquis in want of vinegar, bacon and shoes; desires his aid in procuring them. British moving toward Richmond. The Marquis at Deep Creek, twenty-three miles above. Lead of any description to be forwarded at once. Begs a quarter-cask of wine for "our good Marquis." No. 126.

GRAYSON, WILLIAM (Col.):

No date.—*Fredericksburg.*—Begs him to afford the bearer of this letter, Col. Febiger, all possible assistance in obtaining clothing for the new levies; otherwise, operations in Southern department must be exceedingly retarded. No. 14.

1780.—*October 29. Richmond.*—Enemy landed at Hampton and Portsmouth about the 22d; plundered the former place and reimbarked. Every department deranged. Warlike spirit of the Virginians. Using every possible exertion to arrange two armies; one to act on north side of James river, the other on the south. Gen. Muhlenberg has marched down with certain forces. Gen. Nelson at Williamsburg, assembling militia ordered there. Hard work, providing the army with necessaries. News from the South, Cornwallis retreating rapidly. Encloses particulars of Col. Campbell's action with Col. Ferguson; asks to have it published. Unless enemy can be removed from the State before cold weather the troops must suffer terribly from want of all things. In urgent need of tents and other supplies, promised by Col. Febiger from Philadelphia. No. 16.

1781.—*June 8. Camp, Hunter's Heights.*—The Marquis, having waited at Culpepper Church in vain for Gen. Wayne, advanced to Raccoon Ford. Cornwallis expected to strike Southern communication. Tarleton made descent on Charlottesville on the 4th, routed the assembly, and took stores and prisoners. Gives list of ammunition needed by the Marquis. Great and immediate need of clothing and shoes. Earnest appeal for the support and assistance of Congress. No. 111.

HENDRICK (Col.):

1781.—*June 17. Fredericksburg.*—Quotes passage from the Marquis's letter, dated from Deep Creek, speaking of his want of cavalry; also, shoes, vinegar and rum. Begs his (Hendrick's) help in procuring these things. Letter, to the officer commanding Moylan's detachment, must be carried to him with all speed. Steady and close exertions needed to save the country. Best route over which to send brigade of loaded wagons. No. 127.

JEFFERSON, THOMAS:

1780.—*November 3. Richmond.*—Enclosing return of provision stores. Stock on hand very inconsiderable. Sure Mr. Jefferson will obviate the evil.

P. S.—Despatches to Gen. Gates will not require particular express. No. 28.

1781—*April 2. Williamsburg.*—Mr. Armistead will name certain prisoners for exchange, which measure, if approved, will be carried into execution. Asks that marines taken at Warwick, if not yet sent to Richmond, may be detained until answer comes from British general. Has requested a delay of the ships sailing from New York with Col. Curl, uutil his (Jefferson's) pleasure is known concerning the exchange for Col. Allagood. No. 69.

1781.—*April 3. Williamsburg.*—Acknowledging despatches and forwarding those intended for the flag-ship. Incloses trustworthy account, which corroborates Capt. Ross's with respect reinforcements. Believes that the English will endeavor to succour Lord Cornwallis from Portsmouth by penetrating North Carolina. Question of supporting Gen. Greene powerfully and acting solely on the defensive in Virginia. A permanent and proper force of militia needed to prevent enemy from advancing far into the country. Begs for immediate supply of arms.

P. S.—Wishes to be kept advised of the fate of his friend Greene. No. 70.

1781.—*April 25.*—Inclosing copy of Gen. Phillips' letter of 12th inst.; also, papers concerning exchange of prisoners. Gen. Phillips' complaint of an infringement of the sacred rules of

JEFFERSON, THOMAS (*continued*):

flags of truce, as shown in the person of Mr. Armistead. Incloses a copy of Mr. Armistead's credentials. Has sent Gen. Phillips a copy of the flag with the persons' names and the business they went on. Advises the exchange of as many prisoners as the just rules of war authorize, and the choice of a convenient place for exchange. Marquis now crossing the river. Frederick and Barkley men not yet arrived. No. 87.

JONES (Serg't):

1780.—*August 28. Fredericksburg.*—Orders to proceed to the barracks in Albemarle, there take Col. James Wood's orders for recovering some deserters. Let it be known that all deserters may be assured of free pardon if they voluntarily deliver themselves up. No. 36.

KELLEY (Capt.):

No date.—Orders him to go into the lower country and protect the inhabitants, who are themselves to arm and help him. Capt. Davenport's troop of horse to act with him. Bids him contradict a wicked report to the effect that the army intends to evacuate the lower country. No. 13.

LAFAYETTE, MARQUIS DE:

1781.—*June 9. Camp, Hunter's Heights.*—Received the inclosed from Col. Richard Henry Lee, and has sent down an officer to ascertain clearly the truth of the matter. Expresses have been dispatched to Philadelphia for supplies and clothing, as requested. No. 117.

1781.—*June 11. Camp, Hunter's Heights.*—In consequence of the inclosed, has halted troops from below until further advice. Would submit it whether they had better not return to their own counties to defend them against the enemy's depredations. Officer sent down to ascertain truth of Col. Lee's report, not yet returned. No. 118.

1781.—*June 12. Camp, Hunter's Heights.*—Inclosing extract and copy of two letters received from Col. Grayson, respecting arms. Has stationed proper person at Noland's Ferry to forward them, as directed. Militia of King George and Stafford counties have gone home under promise to be ready to take arms at twelve hours' notice. Men from lower counties await his (LaFayette's) orders. No. 119.

LAFAYETTE, MARQUIS DE (*continued*):

1781.—*June 17. Fredericksburg.*—Acknowledging letter of previous day and promising to attend to every part. Wagons to be sent forward. Difficulties in the way of procuring many shoes. Has asked Gen. Morgan to send officer to seize all shoes in factories round about and send them on. Has sent on 750 stand of arms. Difficult to procure cartridges or lead. Has written to a party of horse from Maryland to press forward day and night. No. 128.

1781.—*June 20. Fredericksburg.*—Six wagons starting before night, with 700 gallons of whisky and 300 gallons of vinegar. Rum out of the question. Impossible to get any shoes in this neighborhood; hopes centre in the back counties. Has written about it to the Board of War. Incloses extract from Col. Grayson's letter. Question of equipping a volunteer corps of dragoons at Leesburg. Capt. Dixon's Volunteer Horse from Gloster hope to get off before night and reach camp on Friday. Desires to know the destination of the arms coming from Philadelphia. Number of arms sent forward. No. 134.

1781.—*June 20. Fredericksburg.*—Will cover all the stores that night. Troops under his command on other side of river. In consequence of his (LaFayette's) letter to Major Page, will afford every assistance to Gen. Wayne in his crossing of the two branches of the river. Weather, alarming! Will hold boats in order to recross, unless he receives other instructions. 200 men from King George have joined him.

P. S.—Col. Tupper and Mr. Kingsley on their way to him (LaFayette) with three or four thousand guineas and some despatches. No. 136.

LEWIS (Capt.):

1781.—*June 2.* From late intelligence, believes Gen. Wayne's troops will cross Norman's Ford. Orders to impress workmen, tools, rafts or any article which will facilitate their passage over the ford; also, if possible, to send an express to Mr. Bruce, who lives near Raccoon Ford and who owns a saw-mill. No. 101.

MATHEWS (Col.):

1781.—*March 31. Williamsburg.*—Desiring him to propose an exchange of volunteers taken at Charles City Court house for an equal number of marines taken in Warwick. No. 63.

MUHLENBERG (Gen.):

1780.—*August 28. Fredericksburg.*—Acknowledging letter of 24th inst. Informing him of number of arms sent forward. Regrets extremely misfortune near Camden. Need of provisions and lack of discipline among the militia proved Gates' overthrow. Has opened the general's letters, marked Public Service. No. 146.

1780.—*November 3. Richmond.*—Acknowledging two favors of 30th ult. Arms for troops at Cabbin's Point to be forwarded that day. Col. Southall's troop of horse has crossed to reinforce him (Muhlenberg), as requested. Engaged in getting a strong brigade together; would like any directions respecting the route and the most eligible position to take. If enemy's depredations are confined to Portsmouth and Princess Anne, will it be necessary to assemble such a large body in one place? Enemy's advantage on the water must be attended to. No. 27.

1781.—*April 4. Williamsburg.*—Gained information of Gen. Muhlenberg's situation through opening his letters to Baron Steuben. Enemy will repent making an attack on his side of river unless they come in force. Advantage the English have on the water. Baron Steuben, before leaving, ordered all the boats to Sandy Point; has sent a guard of forty men to protect them. Discusses his own plans and the enemy's. Positions of the two look-out boats. Any hopes of French fleet and troops landing at Cape Fear? Baron Steuben uneasy on their account. Begs to be kept fully advised of every movement. No. 74.

NELSON, THOMAS (Gen.):

1780.—*October 29. Richmond.*—Sends list of officers who the Executive Board have called upon to furnish their militia with field officers; also incloses an order of Council as a guide by which to arrange the troops. Will send Capt. Kirkpatrick to him in a day or two. Intended coming himself, but military matters too urgent. No. 15.

1780.—*October 30. Richmond.*—Introducing Capt. Kirkpatrick, whom he recommends to the command of a volunteer corps; praises his military experience and firmness. Leaves choice of station on James river to Gen. Nelson's superior knowl-

NELSON, THOMAS (*continued*):

edge of country. Will establish another fleet to be stationed at Sandy Point or Hoods. No. 19.

1780.—*November 2. Richmond.*—Acknowledging his favor of 21st ult. Evident that his despatches of 29th and 30th not yet received. Inclosed in them authority to establish a communication between his (Nelson's) troops and the advance body under Muhlenberg. This to be done with the utmost despatch. Wishes Col. Southall's forty horse to be sent to join Gen. Muhlenberg, who is in great need of them. No. 25.

1781.—*June 9. Camp, Hunter's Heights.*—In consequence of the report that the enemy is in the Rappahannock and Potomac rivers, has directed the colonels in the four lower counties to remain at home until further notice. Orders him (Nelson) to take command of troops from counties of Westmoreland, Richmond, Lancaster and Northumberland, to rendezvous at a convenient place and to consolidate, arrange and train the troops. Further minute directions concerning his movements, in case of the enemy's landing at certain points. No. 114.

1780.—*June 10. Camp, Hunter's Heights.*—Marquis de LaFayette desires a reinforcement of horse immediately. Enemy's superiority of horse subjects him to many evils. His position yesterday was near the borders of Orange county, pointing southward. No. 116.

PAYNE (*Gen.*):

1777.—*June 3. Camp, Hunter's Heights.*—Suggesting a change of route to Norman's Ford. Waiting for express returns from the Marquis to determine his own route. Has sent to the ford to make rafts in case the river rises. Evacuated Fredericksburg the night before and has four hundred militia with him. No. 104.

PRESIDENT OF CONGRESS:

1777.—*December 26. Camp, Valley Forge.*—A protest against the injustice of a resolve passed by Congress, which could affect his honor and his rank in the army. No. 11.

RUDE (Capt.):

1781.—*April 27. Fredericksburg.*—Desiring him to send at once all the cavalry fit for duty to join the Marquis, who is on his way to Richmond. No. 90.

RUSSELL, THOMAS:

1780.—*October 31. Richmond.*—Order to collect a fleet of flat-bottomed boats not to exceed twenty, and to station them at Hoods, on James river. No. 21.

SPOTSWOOD (Gen.):

1781.—*April 27. Fredericksburg.*—The Marquis anxious for a few horse to protect him till his reinforcements arrive. He is on his way to Richmond where there is not a man in arms. Enemy supposed to be in Petersburg. Richmond probably their next object. Need for cavalry. No. 91.

STEUBEN, BARON:

1781.—*April 1. Williamsburg.*—Letter of 28th ult. communicated change of position of troops. From information received, expected an attack, therefore drew (our) extended line together. Gen. Muhlenberg's orders were to keep near the enemy's lines, but before he knew their designs, they embarked. 700 of them crossed over to Newport News with intention of beating up troops at the Half-way House. Finding them withdrawn, they secretly and silently returned. Only nine small and shattered vessels of the enemy got up to Portsmouth with reinforcements. Incloses examination of some deserters. Murmuring of the people consequent on the withdrawal of his troops; has sent detachments there to pacify them. Arms badly needed. Disposition of vessels and boats. No. 67.

1781.—*April 1.* Acknowledging letter of 29th ult. Incloses a letter to him from Gen. Muhlenberg, with an apology for having opened it. Will see by it that the withdrawal of troops from below was exceedingly judicious, the enemy intending to attack some part of the dispersed line. Notwithstanding the necessity of the measure, the people below murmur and threaten to make terms with the enemy. Thinks of sending a light corps there with a prudent officer. Exceedingly distressed for arms. Would like 200 sent on immediately. Disposition of boats. Marquis' barge made prize of a vessel on James river, fitted out on a pirate plan, which had done much mischief to the shores of Maryland and Virginia. Mr. Lane sent the rascals to the Governor to meet their just rewards. No. 65.

STEUBEN, BARON (*continued*):

1781.—*April 3. Williamsburg.*—Apologizing for having opened a letter from Gen. Muhlenberg to him (Steuben). Account of Muhlenberg's confidential agent corroborates that of Capt. Ross. Always his own opinion that the English would try hard to succour Cornwallis by penetrating North Carolina, at the same time, holding a strong post in Virginia to keep them diverted. Fatal consequences should they prove superior in the South. Propriety of supporting Greene. Asks for directions concerning a considerable number of public horses, of no use to his post. Distressed for arms. No. 71.

1781.—*April 8. Williamsburg.*—Inclosing copies of his correspondence with Gen. Phillips, concerning exchange of prisoners. Careful in his letters not to show favoritism. Object of enemy's preparations probably a junction with Cornwallis, but uncertain by which route. French fleet arrived safely at Rhode Island. Sends British account of the engagement of the 16th. No. 80.

1781.—*April 25. Williamsburg.*—Acknowledging letter of 11th inst. from Richmond. Announcing his intended departure for Fredericksburg. Will report on his arrival. Incloses copies of his correspondence with Gen. Phillips. Hopes he has not incurred Baron Steuben's censure by what he has said. Exceedingly desirous of cultivating the liberal idea held out by Gen. Phillips, as it will result in reciprocal advantages. Has directed Col. Innes to take command until Gen. Nelson arrives. Incloses general return of the troops. No. 88.

1781.—*April 26. Fredericksburg.*—Concerning his correspondence with Gen. Phillips about the exchange of prisoners. Advises him to liberate all American prisoners taken in arms. Good results accruing from this. Many prisoners at large in Winchester, some of whom make their escape. Advantage of exchanging these very men for Americans on board prison-ships. Frederick and Barkley riflemen on their march. Unless directed otherwise, will come down with them. No. 89.

WASHINGTON, GEORGE (Gen.):

1777.—*December 29. Valley Forge.*—A detailed account of a permanent system to be adopted in future promotions, regula-

WASHINGTON, GENERAL (*continued*):

tions and arrangements in the army. One-half of the present staff belonging to the army, idle and pleasure-loving; mere sinecures, of no benefit to the public. Reforms needed.
No. 12.

1780.—*August 24. Fredericksburg.*—Present military law for raising 3000 new levies exempts those who apprehend and deliver over deserters. Danger of impositions under this rule. Suggests slight changes in the law. Also proposes that Gen. Washington should offer free pardon to all deserters who deliver themselves up by a certain day. All who escaped from Bluford's rout brought in as deserters; this, of course, wrong. No. 33.

1781.—*April 8. Williamsburg.*—Acknowledging letter, directing the disposal of militia. Incloses general return of counties making his defences on his side of James river. In writing British General at Portsmouth about exchange of prisoners, the list for exchange left entirely to the Executive. Dangers of favoritism; therefore merely hinted at the justness of such a favor, leaving Mr. Armistead to mention Col. Curle as the object of the hint. Desire of Gen. Phillips, as well as himself, to encourage liberal exchanges, therefore begs to be authorized to assure the British General that on his sending out the whole number of prisoners taken in arms, an equal number shall be sent back. Enemy's preparations for a move; nearly all their ships gone out. No. 79.

1781.—*April 11. Williamsburg.*—Has received a report from a Mr. Turberville that a small fleet of the enemy's vessels is in the Potomac. Fears they will visit Hunter's works and the gun factory in Fredericksburg, both important points, totally undefended. Proposes marching some of the troops back for their defense. Names troops whose tour of duty will soon expire, as suitable for that purpose. Thinks Mr. Beal's offer of 1000 weight of lead ought to be accepted. No. 83.

WASHINGTON, JOHN A. (Col.):

1781.—*June 8. Camp, Hunter's Heights.*—Requesting troops to halt, as it appears the enemy are at Guynn's Island in the Potomac. Would like officer sent to get information and to report at once. Gives him leave to impress horses for this service, being careful to return them to their owners. No. 112.

WOOD, JAMES (Capt.):

1780.—*August 28. Fredericksburg.*—Has information of the whereabouts of four deserters. Desires him to send Sergeant Jones to apprehend them. Every one's duty to recover as many deserters as possible rather than allow rascals, after long concealing them, to give them up in order to get excused from service themselves. Gen. Gates defeated at Camden; has retreated to Hillsborough. Particulars not yet at hand. No. 34.

MISCELLANEOUS LETTERS AND PAPERS.

BRADFORD, SAMUEL K., Aid-de-Camp to WILLIAM PRICE, Wagon-Master:

1780.—*August 28. Fredericksburg.* — Orders to proceed with brigade of wagons to Richmond, and to suffer no delay en route. On arriving to apply to Brig.-Gen. Muhlenberg for orders, or in his absence to the officer in command, before unloading. Nature of service requiring utmost expedition and attention. This by order of Gen. Weedon. No. 35.

BRADFORD, SAMUEL K., to WILLIAM WOODSIDES:

1781.—*August 31. Fredericksburg.*—Orders to proceed with utmost despatch to Richmond with brigade of wagons, and to report to Gen. Muhlenberg, or in his absence, to the officer in command, before unloading. No. 37.

JEFFERSON, THOMAS, to MAJOR P. COOKE:

1780.—*November 2. In Council.*—Unless armed elsewhere, the fifty Marylanders passing to the southward can be armed at Richmond. Will countermand all the militia called from the proprietary counties. With this deduction, militia will number 4150, which, with the new levies, will be sufficient. No. 24.

JEFFERSON, THOMAS, to GEN. MUHLENBERG:

1780.—*October 28. Richmond.*—Incloses latest intelligence from north side of river, also advice of Council for regimenting the militia. Leaves it to the General to overcome certain difficulties which must arise between the militia and the regular Captains and subalterns. Incloses names of many resigned and supernumerary officers and dates of their original appointments, also letters to be directed to such as can be got. No. 48.

NELSON, WILLIAM (Col. Commandant), orders from:

1781.—*June 20. Leeds.*—Orders for Capt. —— to take command of a company, to march them to —— county and use utmost exertion to prevent depredations of the enemy; also, to change ground frequently, to keep order and discipline among the men, to attend to the shores of rivers, etc., and to prevent escape of slaves and disaffected persons. No. 124.

PAGE, JOHN, to GEN. WASHINGTON (?):

1777.—*October 30. Williamsburg.*—Received his two letters, one announcing Burgoyne's surrender. Joy of the troops! Now past ten P.M., and the victory still being celebrated in the streets. Britain's wilful abuse of power. Heaven on "our" side. Confident of ultimate victory. Letter just received from Baltimore says Howe is retreating to his ships and Washington is in possession of Philadelphia. If true, congratulations! George III must see he paid dear for the taking of Philadelphia. Very late and has been obliged to go into the streets to prevent a riot. No. 8.

PHILLIPS, WILLIAM, to GEN. MUHLENBERG:

1781.—*April 7. Portsmouth.*—Protest against allowing individuals to enter within the outposts of the King's forces under his command, unless proceeding directly from an American general officer. Such requests as those respecting negroes may be sent in writing. As regards subject of negroes, refers him to the explanation given by Brigadier-General Arnold. No. 78.

STEUBEN, BARON, general orders of:

1781.—*April 1. Chesterfield.*—Every wagon, horse, etc., impressed since 1st day of January to be collected and returned to Quartermaster at Williamsburg or Suffolk without delay. Inattention to this order an injustice to the public, and shall be treated as such. No. 68.

WEEDON, GEN., general orders from:

1781.—*June 16. Leeds.*—Orders to allow the men of their county furloughs to go home, but to be ready at a moment's warning to repel the enemy, should they attempt to land in force. Humane reasons for the above indulgence of furloughs. Place to have a legion of horse and foot formed in the lower counties to be composed of single men. No. 124.

WEEDON's (Gen.), handwriting:

1780.—*November 2. Richmond.*—Examination of a deserter, by name Peter Christian (Sergeant). Suggests the countermanding of some of the militia called into service, in consequence of the information gathered from this deserter, a reliable man. No. 57.

No date.—No name. Note relating to the landing of the British at the capes of Virginia. Detailed account of their number and movements. No. 152.

CALENDAR OF THE CORRESPONDENCE OF RICHARD HENRY LEE AND ARTHUR LEE.

IN THE LIBRARY OF THE AMERICAN PHILOSOPHICAL SOCIETY.[1]

Prepared under the direction of the Committee on Historical Manuscripts.

(*Read May 5, 1899.*)

LETTERS TO RICHARD HENRY LEE.

ADAMS, JOHN:

1780.—*March 15, Paris, Rue de Richelieu, Hotel de Valois.* See R. H. Lee's "Life of Richard Henry Lee," Philadelphia, 1825, Vol. ii, p. 137. Vol. ii, p. 199, No. 55.

1785.—*April 29, Auteuil.* See "Life of Richard Henry Lee," Vol. ii, p. 140. Vol. ii, p. 290, No. 78.

1785.—*July 15, Westminster, Grosvenor Square.* See "Life of Richard Henry Lee," Vol. ii, p. 141. Vol. ii, p. 299, No. 80.

1785.—*September 6, Westminster, Grosvenor Square.* See "Life of Richard Henry Lee," Vol. ii, p. 143. Vol. ii, p. 311, No. 83.

ADAMS, SAMUEL:

1773.—*April 10, Boston.* See "Life of Richard Henry Lee," Vol. i, p. 87. Vol. i, p. 71, No. 23.

[1] These manuscript letters are contained in two volumes.

ADAMS, SAMUEL (*continued*):

1774.—*July 15, Boston.* See "Life of Richard Henry Lee," Vol. i, p. 99. Vol. i, p. 61, No. 21.

1775.—*March 21, Boston.* Unfinished letter. See "Life of Richard Henry Lee," Vol. ii, p. 118. Vol. i, p. 133, No. 39.

1776.—*July 15, Philadelphia.* See "Life of Richard Henry Lee," Vol. i, p. 182. Vol. i, p. 215, No. 62.

1777.—*June 26, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 120. Vol. i, p. 325, No. 93.

1778.—*April 20, Boston.* See "Life of Richard Henry Lee," Vol. ii, p. 124. Vol. ii, p. 55, No. 17.

1784.—*December 9, Boston.* See "Life of Richard Henry Lee," Vol. ii, p. 127. Vol. ii, p. 250, No. 70.

1784.—*December 23, Boston.* See "Life of Richard Henry Lee," Vol. ii, p. 128. Vol. ii, p. 258, No. 70.

1787.—*December 3, Boston.* See "Life of Richard Henry Lee," Vol. ii, p. 130. Vol. ii, p. 319, No. 85.

1789.—*April 22, Boston.* See "Life of Richard Henry Lee," Vol. ii, p. 132. Vol. ii, p. 335, No. 89.

1789.—*July 14, Boston.* See "Life of Richard Henry Lee," Vol. ii, p. 133. Vol. ii, p. 339, No. 90.

1789.—*August 24, Boston.* See "Life of Richard Henry Lee," Vol ii, p. 134. Vol. ii, p. 347, No. 92.

1789.—*August 29, Boston.* See "Life of Richard Henry Lee," Vol. ii, p. 135. Vol. ii, p. 351, No. 93.

CARMICHAEL, WILLIAM:

1777.—*March 17, Paris.* Slightly abbreviated in "Life of Richard Henry Lee," Vol. i, p. 197. Vol. i, p. 289, No. 84.

CONWAY, THOMAS:

1778.—*May 23, Fishkill.* See "Life of Richard Henry Lee," Vol. i, p. 294. Vol. ii, p. 59, No. 18.

CHASE, SAMUEL:

1776.—*July 30, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 180. Vol. i, p. 219, No. 63.

CHASE, SAMUEL (*continued*):

1777.—*November 28, Annapolis.* See "Life of Richard Henry Lee," Vol. ii, p. 182. Vol. ii, p. 27, No. 9.

1789.—*July 2, Baltimore* (probably to R. H. Lee). See "Life of Richard Henry Lee," Vol. ii, p. 183. Vol. ii, p. 323, No. 86.

BARON DE KALB:

1777.—*September 16, Bristol.* See "Life of Richard Henry Lee," Vol. i, p. 296. Vol. i, p. 339, No. 99.

1778.—*August 17, Camp at White Plains.* See "Life of Richard Henry Lee," Vol. i, p. 295. Vol. ii, p. 91, No. 27.

DICKINSON, JOHN:

1768.—*August 10, Philadelphia.* Fragment. Merely the ending of a letter. Vol. i, p. 37, No. 15.

1769.—*January 16, Philadelphia.* See "Life of Richard Henry Lee," Vol. i, p. 68. Vol. i, pp. 33, 32, No. 12.

1769.—*June 22, Philadelphia.* See "Life of Richard Henry Lee," Vol. i, p. 76. Vol. i, pp. 31, 30, No. 11.

1773.—*May 30, Fairhill.* See "Life of Richard Henry Lee," Vol. i, p. 91. Vol. i, pp. 36, 35, No. 14.

FLORIDA BLANCA, COUNT DE:

1784.—*October 8, St. Lorenzo.* A letter of introduction for Don Diego de Gardoque, appointed by the King of Spain Minister Plenipotentiary to the United States. Vol. ii, p. 246, No. 67.

GATES, HORATIO:

1778.—*September 23, Danbury.* See "Life of Richard Henry Lee," Vol. ii, p. 227. Vol. ii, p. 102, No. 29.

GERRY, ELBRIDGE:

1789.—*February 9, Cambridge.* See "Life of Richard Henry Lee," Vol. ii, p. 144. Vol. ii, p. 327, No. 87.

GRASSE, COUNT DE:

1781.—*January 8, Paris.* French letter and translation. See "Life of Richard Henry Lee," Vol. i, p. 298. Vol. ii, p. 209, No. 57.

HENRY, PATRICK:

1778.—*June 18, Williamsburg.* See "Life of Richard Henry Lee," Vol. i, p. 195. Vol. ii, p. 63, No. 19.

HOLKER (*French Consul*):

1779.—*April 5.* See "Life of Richard Henry Lee," Vol. i, p. 199. Vol. ii, p. 150, No. 41.

1779.—*April 22, Philadelphia.* Offering to the United States a loan of a million dollars, on behalf of several persons in France. Vol. ii, p. 146, No. 40.

JAY, JOHN:

1823.—*February 12, Bedford, Westchester county, N. Y.* See "Life of Richard Henry Lee," Vol. i, p. 270. Vol. ii, p. 359, No. 95.

JEFFERSON, THOMAS:

1779.—*June 17, Williamsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 189. Vol. ii, p. 164, No. 45.

1781.—*March 10.* In council. See "Life of Richard Henry Lee," Vol. ii, p. 190. Vol. ii, p. 212, No. 58.

JENINGS, EDMUND:

1771.—*August 17, London.* Letter slightly abbreviated. See "Life of Richard Henry Lee," Vol. i, p. 50. Vol. i, p. 87, No. 27.

1771.—*December 29, London.* See "Life of Richard Henry Lee," Vol. i, p. 50. Vol. i, p. 111, No. 33.

LAFAYETTE, MARQUIS DE:

1778.—*July 2, Camp at Brunswick.* See "Life of Richard Henry Lee," Vol. ii, p. 105. Vol. ii, p. 73, No. 22.

1779.—*January 7, on board the "Alliance."* See "Life of Richard Henry Lee," Vol. ii, p. 107. Vol. ii, p. 130, No. 36.

1779.—*June 13.* Bidding him good-by on the eve of his departure for Versailles. Compliments him on his son. Desires Arthur Lee's further acquaintance. Vol. ii, p. 156, No. 43.

1779.—*October 7, Havre.* See "Life of Richard Henry Lee," Vol. ii, p. 108. Vol. ii, p. 134, No. 37.

LAFAYETTE, MARQUIS DE (*continued*):

1780.—*December 17, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 109. Vol. ii, p. 192, No. 53.

1785.—*March 16, Paris* (probably to R. H. Lee). See "Life of Richard Henry Lee," Vol. ii, p. 109.
Vol. ii, p. 282, No. 76.

LAURENS, HENRY:

1779.—*June 22, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 233. Vol. ii, p. 160, No. 44.

1779.—*August 31, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 234. Vol. ii, p. 176, No. 49.

1779.—*September 28, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 236. Vol. ii, p. 184, No. 51.

1779.—*October 12, Philadelphia.* No further news of Count d'Estaing. Letters from France to Col. F. L. Lee and R. H. Lee; they are to be printed if possible. Two letters to be read in Congress. Salaries of Ministers Plenipotentiary. Refuses vote to Carmichael; his reason for this.
Vol. ii, p. 188, No. 52.

LEE, ARTHUR:

1768.—*December 27, London.* See "Life of Richard Henry Lee," Vol. i, p. 59. Vol. i, p. 39, No. 16.

1768 or 1769.—*October 9* (probably to R. H. Lee). See "Life of Arthur Lee," Boston, 1829. Vol. i, p. 200; see "Life of Richard Henry Lee," Vol. i, p. 260. Paragraph omitted in printed copy, in which he begs his brother to send to Dr. Fothergill and Dr. Cullen some American wine.
Vol. i, p. 53, No. 19.

1769.—*August 15, Bath.* See "Life of Arthur Lee," Vol. i, p. 194; see "Life of Richard Henry Lee," Vol. i, p. 255.
Vol. i, p. 43, No. 17.

1769.—*September 18, Ipswich.* See "Life of Arthur Lee," Vol. i, p. 190; see "Life of Richard Henry Lee," Vol. i, p. 72.
Vol. i, p. 19, No. 7.

1769.—*November 19, Bath.* See "Life of Arthur Lee," Vol. i, p. 193; see "Life of Richard Henry Lee," Vol. i, p. 81.
Vol. i, p. 17, No. 6.

LEE, ARTHUR (*continued*):

1769.—*November 15, Bath.* See "Life of Arthur Lee," Vol. i, p. 197; see "Life of Richard Henry Lee," Vol. i, p. 258. Vol. i, p. 51, No. 18.

1769.—*December 3, Bow Wood.* See "Life of Richard Henry Lee," Vol. i, p. 75. Vol. i, p. 57, No. 20.

1770.—*May 20, London.* See "Life of Arthur Lee," Vol. i, p. 205; see "Life of Richard Henry Lee," Vol. i, p. 82. Latter part of letter was published, in which he speaks of his five years' law course. Some business about land grants. Vol. i, p. 65, No. 22.

1770.—*October 20, London.* Concerning the slight chance of procuring his brother Richard a secretaryship. Vol. i, p. 121, No. 36.

1772.—*August 17, London.* Much abbreviated in "Life of Richard Henry Lee," Vol. i, p. 83; much abbreviated in "Life of Arthur Lee," Vol. i, p. 206. Part omitted speaks of personal money matters. Death of Mr. Horrocks; character of his successor. Question of school for his nephews. Dr. Franklin's continued stay gives him small chance of the Boston Agency. Influence requisite to obtain for his brother a diplomatic position. Vol. i, p. 91, No. 28.

1774.—*March 18, London.* See "Life of Arthur Lee," Vol. i, p. 207; see "Life of Richard Henry Lee," Vol. i, p. 93. Vol. i, pp. 78, 77, 76, 75, No. 24.

1774.—*December 22, 24, 26, London.* See "Life of Arthur Lee," Vol. i, p. 211; see "Life of Richard Henry Lee," Vol. i, p. 134. Vol. i, p. 107, No. 32.

LEE, CHARLES:

1775.—*September 2, Camp on Winter Hill.* See "Life of Richard Henry Lee," Vol. i, p. 157. Vol. i, p. 151, No. 45.

1775.—*December 12, Camp.* See "Life of Richard Henry Lee," Vol. ii, p. 214. Vol. i, p. 163, No. 48.

1776.—*May 10, Williamsburg.* See "Life of Richard Henry Lee," Vol. i, p. 166. Postscript omitted in published copy. Urges Congress to take *Niagara* and *Detroit.* Too much money and attention paid to fleet. Vol. i, p. 203, No. 59.

LEE, CHARLES (*continued*):

1776.—*April 5, Williamsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 215. His private opinion of Pendleton and Bland omitted in the published letter.
Vol. i, p. 195, No. 57.

1776.—*April 12, Williamsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 216. Vol. i, p. 199, No. 58.

1777.—*While in Captivity.* See "Life of Richard Henry Lee," Vol. i, p. 180. Vol. ii, p. 42, No. 13.
For answer, see MS. Vol. i, p. 187.

LEE, WILLIAM:

1777.—*December 3, Paris.* Deals with the refusal of the King of Prussia to allow troops in the service of Great Britain to pass through his dominions, *en route* for America. Lord Chatham's speech in the House of Lords.
Vol. ii, p. 31, No. 10.

1778.—*September 21, Paris.* See "Life of Richard Henry Lee," Vol. ii, p. 212. Vol. ii, p. 97, No. 28.

1778.—*October 17, Frankfort, Germany.* See "Life of Richard Henry Lee," Vol. ii, p. 228. Paragraph omitted in published copy, concerning grants of land. Vol. ii, p. 116, No. 32.

LOVELL, JAMES:

1777.—*December 28* (probably to R. H. Lee). See "Life of Richard Henry Lee," Vol. ii, p. 150.
Vol. ii, p. 37, No. 12.

1778.—*December 18.* Enclosing letter from Arthur Lee to Samuel Adams, dated Paris, July 31. See "Life of Richard Henry Lee," Vol. ii, p. 148. Vol. ii, p. 126, No. 35.

1779.—*August 17.* See "Life of Richard Henry Lee," Vol. ii, p. 146. Vol. ii, p. 168, No. 47.

1780.—*August 31.* See "Life of Richard Henry Lee," Vol. i, p. 231. Vol. i, p. 15, No. 5.

M'KEAN, THOMAS:

1780.—*March 25, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 176. Vol. ii, p. 138, No. 38.

MIFFLIN, THOMAS (Gen.):

1777.—*November 5, Reading.* See "Life of Richard Henry Lee," Vol. ii, p. 173. Vol. ii, p. 13, No. 5.

1777.—*November 12, Reading.* See "Life of Richard Henry Lee," Vol. ii, p. 174. Vol. ii, p. 23, No. 8.

MONROE, JAMES:

1783.—*April 4, King George.* See "Life of Richard Henry Lee," Vol. ii, p. 225. Vol. ii, p. 236, No. 64.

1786.—*May 24, New York* (probably to R. H. Lee). See "Life of Richard Henry Lee," Vol. ii, p. 224. Vol. ii, p. 315, No. 84.

MORRIS, GOUVERNEUR:

1775.—*Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 154. Vol. i, p. 167, No. 49.
For answer see MS. Vol. i, p. 141.

PAGE, JOHN:

1776.—*February 20, Williamsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 199. Vol. i, p. 179, No. 53.

1778.—*July 10, Williamsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 200. Vol. ii, p. 75, No. 23.

1778.—*October 15, Williamsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 201. Vol. ii, p. 112, No. 31.

PAGE, MANN:

1777.—*September 23, Mansfield.* See "Life of Richard Henry Lee," Vol. ii, p. 203. Vol. i, p. 343, No. 100.

1777.—*October 27, Mansfield.* See "Life of Richard Henry Lee," Vol. ii, p. 203. Vol. ii, p. 9, No. 4.

1778.—*June 23, Mansfield.* See "Life of Richard Henry Lee," Vol. ii, p. 204. Vol. ii, p. 67, No. 20.

PAINE, THOMAS:

1777.—*July 1, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 156. Vol. i, p. 333, No. 96.

PEABODY, NATHANIEL:

1780.—*October 27, Morristown, N. J.* See "Life of Richard Henry Lee," Vol. ii, p. 157. Vol. ii, p. 195, No. 54.

PENDLETON, EDMUND:

1776.—*April 8, Caroline.* See "Life of Richard Henry Lee," Vol. ii, p. 192. Vol. i, p. 223, No. 64.

1777.—*September 3, Caroline.* See "Life of Richard Henry Lee," Vol. ii, p. 193. Vol. i, p. 337, No. 98.

1777.—*October 11, Caroline.* See "Life of Richard Henry Lee," Vol. ii, p. 193. Vol. i, p. 347, No. 101.

1785.—*February 28, Edmundsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 195. Vol. ii, p. 270, No. 73.

1785.—*March 7, Edmundsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 196. Vol. ii, p. 274, No. 74.

1785.—*April 18, Edmundsburg, Va.* See "Life of Richard Henry Lee," Vol. ii, p. 197. Vol. ii, p. 286, No. 77.

"PHILOPATRIA:"

1775.—*June 1, Eastown.* See "Life of Richard Henry Lee," Vol. i, p. 155. Vol. i, p. 143, No. 43.

PULASKI, COUNT:

1778.—*August 13, Wilmington.* See "Life of Richard Henry Lee," Vol. i, p. 296. Vol. ii, p. 87, No. 26.

REED, JOSEPH:

1780.—*April 15, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 175. Vol. ii, p. 142, No. 39.

RUSH, BENJAMIN:

1776.—*December 20, Philadelphia.* See "Life Richard Henry Lee," Vol. ii, p. 159. Paragraph about Mr. Dickinson omitted in published letter. Vol. i, p. 230, No. 67.

1776.—*December 21, near Bristol.* See "Life of Richard Henry Lee," Vol. ii, p. 160. Advice about recruiting the army omitted in published letter. Vol. i, p. 237, No. 68.

1776.—*December 30, Crossides.* See "Life of Richard Henry Lee," Vol. ii, p. 161. Vol. i, p. 243, No. 70.

1776.—*January 6, Bordentown.* See "Life of Richard Henry Lee," Vol. ii, p. 163. Vol. i, pp. 178, 177, No. 52.

1777.—*January 7, Princeton.* See "Life of Richard Henry Lee," Vol. ii, p. 163. Vol. i, p. 265, No. 77.

RUSH, BENJAMIN (*continued*):

1777.—*January 14, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 165. Vol. i, p. 273, No. 79.

1777.—*January 14, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 166. Vol. i, p. 277, No. 80.

SCHUYLER, PHILIP:

1775.—*October 19, Ticonderoga.* See "Life of Richard Henry Lee," Vol. ii, p. 155. Vol. i, p. 159, No. 47.

SHIPPEN, WILLIAM, JR.:

1776.—*December 17, Bethlehem.* See "Life of Richard Henry Lee," Vol. ii, p. 167. Vol. i, p. 229, No. 66.

1776.—*December 20, Bethlehem.* See "Life of Richard Henry Lee," Vol. ii, p. 168. Vol. i, p. 247, No. 71.

1777.—*January 17, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 169. Vol. i, pp. 281, 282, No. 81.

STEPHEN, ADAM:

1774.—*August 27, Berkeley Courthouse.* See "Life of Richard Henry Lee," Vol. ii, p. 207. Vol. i, p. 95, No. 29.

1775.—*February 1.* See "Life of Richard Henry Lee," Vol. ii, p. 208. Vol. i, p. 125, No. 37.

1775.—*February 17.* See "Life of Richard Henry Lee," Vol. ii, p. 210. Vol. i, p. 129, No. 38.

1775.—*September 23, Pittsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 211. Vol. i, p. 155, No. 46.

1777.—*April 22, Chatham.* See "Life of Richard Henry Lee," Vol. ii, p. 211. Vol. i, p. 297, No. 86.

SULLIVAN, JAMES:

1789.—*April 11, Boston.* See "Life of Richard Henry Lee," Vol. ii, p. 152. Vol. ii, p. 331, No. 88.

WASHINGTON, GEORGE:

1774.—*August 9, Fredericksburg.* See "Life of Richard Henry Lee," Vol. i, p. 105. Vol. i, p. 83, No. 26.

1775.—*July 10, Camp at Cambridge.* See "Life of Richard Henry Lee," Vol. ii, p. 1. No postscript in original MS. Vol. i, p. 147, No. 44.

WASHINGTON, GEORGE (*continued*):

1775.—*October 29, Cambridge.* See "Life of Richard Henry Lee," Vol. ii, p. 6. Vol. i, p. 99, No. 30.

1775.—*November 27, Cambridge.* See "Life of Richard Henry Lee," Vol. ii, p. 7. Vol. i, p. 103, No. 31.

1775.—*December 26, Cambridge.* See "Life of Richard Henry Lee," Vol. ii, p. 8. Vol. i, p. 183, No. 54.

1776.—*April 4, Cambridge.* See "Life of Richard Henry Lee," Vol. ii, p. 10. Unpublished P. S. Speaks of the need of a hospital. Vol. i, p. 189, No. 56.

1776.—*May 11, New York.* See "Life of Richard Henry Lee," Vol. ii, p. 11. Vol. i, p. 207, No. 60.

1777.—*January 10, Morristown.* See "Life of Richard Henry Lee," Vol. ii, p. 11. Vol. i, p. 269, No. 78.

1777.—*March 6, Morristown.* See "Life of Richard Henry Lee," Vol. ii, p. 12. Vol. i, p. 285, No. 83.

1777.—*April 24, Morristown.* See "Life of Richard Henry Lee," Vol. ii, p. 12. Vol. i, p. 301, No. 87.

1777.—*May 10, Morristown.* See "Life of Richard Henry Lee," Vol. ii, p. 15. Vol. i, p. 305, No. 88.

1777.—*May 17, Morristown.* See "Life of Richard Henry Lee," Vol. ii, p. 15. Vol. i, p. 309, No. 89.

1777.—*June 1, Camp at Middlebrook.* See "Life of Richard Henry Lee," Vol. ii, p. 18. Vol. i, p. 315, No. 91.

1778.—*February 15, Valley Forge.* See "Life of Richard Henry Lee," Vol. ii, p. 20. Vol. ii, p. 47, No. 15.

1778.—*August 10, White Plains* (probably to R. H. Lee). See "Life of Richard Henry Lee," Vol. ii, p. 22. Vol. ii, p. 83, No. 25.

1778.—*September 23, Fredericksburg, N. Y.* See "Life of Richard Henry Lee," Vol. ii, p. 23. Vol. ii, p. 108, No. 30.

1779.—*May 5, Headquarters Middle Brook* (not only to R. H. Lee but to Henry Lawrence and Thomas Burke). See "Life of Richard Henry Lee," Vol. ii, p. 24. Vol. ii, p. 152, No. 42.

WASHINGTON, GEORGE (*continued*):

1784.—*June 12, Mount Vernon.* See "Life of Richard Henry Lee," Vol. ii, p. 25. Vol. ii, p. 242, No. 66.

1784.—*December 14, Mount Vernon.* See "Life of Richard Henry Lee," Vol. ii, p. 6. Vol. ii, p. 258, No. 71.

1785.—*February 8, Mount Vernon.* See "Life of Richard Henry Lee," Vol. ii, p. 28. Vol. ii, p. 262, No. 72.

1785.—*March 15, Mount Vernon.* See "Life of Richard Henry Lee," Vol. ii, p. 32. Vol. ii, p. 272, No. 75.

1785.—*June 22, Mount Vernon* (probably to R. H. Lee). See "Life of Richard Henry Lee," Vol ii, p. 31. Vol. ii, p. 295, No. 79.

1785.—*August 22, Mount Vernon* (probably to R. H. Lee). See "Life of Richard Henry Lee," Vol. ii, p. 33. Vol. ii, p. 307, No. 82.

1789.—*August 2, New York.* See "Life of Richard Henry Lee," Vol. ii, p. 36. Vol. ii, p. 343, No. 91.

WEEDON, GEORGE:

1781.—*June 15, Fredericksburg.* See "Life of Richard Henry Lee," Vol. ii, p. 205. Vol. ii, p. 216, No. 59.

1781.—*August 2, Fredericksburg.* See "Life of Richard Henry Lee," Vol. ii, p. 206. Vol. ii, p. 220, No. 60.

1781.—*September 20, Camp, Gloucester Courthouse.* See "Life of Richard Henry Lee," Vol. ii, p. 206. Vol. ii, p. 228, No. 62.

WHIPPLE, WILLIAM:

1778.—*November 8, Philadelphia.* See "Life of Richard Henry Lee," Vol. i, p. 216. Vol. i, p. 120, No. 33.

1779.—*August 23, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 111. Vol. ii, p. 172, No. 48.

1779.—*September 18, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 112. Vol. ii, p. 180, No. 50.

1783.—*April 17, Portsmouth, N. H.* See "Life of Richard Henry Lee," Vol. i, p. 238. Vol. ii, p. 240, No. 65.

WHIPPLE, WILLIAM (*continued*):

1783.—*September 15, Portsmouth.* See "Life of Richard Henry Lee," Vol. ii, p. 113. Vol. ii, p. 232, No. 63.

WYTHE, GEORGE:

1777.—*August 24, Williamsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 185. Vol. ii, pp. 336, 335, No. 97.

1777.—*October 18, Williamsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 186. Vol. ii, p. 1, No. 1.

1777.—*November 6, Williamsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 187. Vol. ii, p. 17, No. 6.

1778.—*August 1, Williamsburg.* See "Life of Richard Henry Lee," Vol. ii, p. 187. Vol. ii, p. 79, No. 24.

LETTERS TO ARTHUR LEE.

ADAMSON, DR. (in Latin):

1766.—*February 22.* Enclosing a leaf (since lost) of some recently discovered plant. Expresses a hope that Mr. Lee will become the botanist of America. Vol. i, p. 1, No. 1.

BARRÉ (Col.):

1771.—*January 31, London.* See "Life of Richard Henry Lee," Vol. i, p. 265. Vol. i, pp. 82, 83, No. 25.

CARDROSS, LORD (afterwards Earl Buchan):

1767.—*October 31, Walcot near Bath.* See "Life of Richard Henry Lee," Vol. i, p. 263; see "Life of Arthur Lee," Vol. ii, p. 345. Vol. i, p. 21, No. 8.

JONES, SIR WILLIAM:

1790.—*October 14, Bengal, Chrisna Nagar.* A letter concerning the legal affairs of Mr. Stepdoe. Postscript dated Calcutta, November 7, 1790. Vol. ii, p. 355, No. 94.

LEE, WILLIAM:

1780.—*August 15.* See "Life of Richard Henry Lee," Vol. ii, p. 231. Vol. ii, p. 166, No. 46.

M'KEAN, THOMAS:

1781.—*September 4, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 178. Vol. ii, p. 224, No. 61.

WILKES, JOHN:

1777.—*November 9, Prince's Court.* See "Life of Richard Henry Lee," Vol. i, p. 264. Vol. ii, p. 19, No. 7.

WYNDHAM, WILLIAM:

1778.—*March 12, Dunkirk.* See "Life of Richard Henry Lee," Vol. i, p. 266. Vol. ii, p. 51, No. 16.

LETTERS FROM RICHARD HENRY LEE.

DICKINSON, JOHN:

1768.—*November 26, Chantilly, Va.* See "Life of Richard Henry Lee," Vol. i, p. 66. Vol. i, pp. 37, 38, 34, No. 13.

1773.—*April 4, Chantilly, Va.* See "Life of Richard Henry Lee," Vol. i, p. 90. For answer see "Life of R. H. Lee," Vol. i, p. 91. Vol. i, p. 29, 36, No. 10.

FLORIDA BLANCA, COUNT DE:

1785.—*October 6, New York.* Impaired health necessitates his retirement from Congress. Assures him that Don Diego de Gardoque has been received with due honor. Desires above all things friendly and commercial relations with Spain. Vol. ii, p. 247, No. 68.

HENRY, PATRICK:

1777.—*May —.* Speaks of accusations made against him by his enemies. Gives hopeful account of the army. Gen. Tryon's wound mortal. Vol. i, p. 211, No. 61.

JOHNSON (GOV.):

1777.—*December 13, Stafford Co.* About the Marylanders trading with the English ships of war. Advises means to prevent its continuance. Vol. ii, p. 35, No. 11.

LEE, CHARLES:

1777.—*February 11, Philadelphia.* See "Life of Richard Henry Lee," Vol. i, p. 181. Vol. i, p. 187, No. 55.

MORRIS, GOUVERNEUR:

1775.—*May 28.* See "Life of Richard Henry Lee," Vol. ii, p. 155. Vol. i, p. 141, No. 42.

PAINE, THOMAS:

1777.—*July 13, Chantilly, Va.* Concerning the importance of France and Spain as allies. Advises their being at once informed of American achievements so far.
Vol. i, p. 331, No. 95.

WASHINGTON, GEORGE:

1777.—*May 22, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 17. Vol. i, p. 313, No. 90.

1778.—*January 2, Chantilly, Va.* See "Life of Richard Henry Lee," Vol. ii, p. 19. Vol. ii, p. 45, No. 14.

1778.—*June 24, York.* See "Life of Richard Henry Lee," Vol. ii, p. 2. Vol. ii, p. 71, No. 21.

WYTHE, GEORGE:

1777.—*October 19, York, in Pennsylvania.* Burgoyne's defeat. Gen. Howe in danger. Speaks of slanders he has been subjected to, in regard to payment of rents. Begs Mr. Wythe to place the matter in clear light before the House.
Vol. ii, p. 3, No. 2.

MISCELLANEOUS LETTERS.

ADAMS, SAMUEL, to DENNYS DEBIRDT, Esq.:

1768.—*May 14, Boston.* See "Life of Richard Henry Lee," Vol. ii, p. 115. Vol. i, p. 25, No. 9.

ADAMS, SAMUEL, to person unknown:

1781.—*January 15, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 126. Paragraph concerning an unpaid debt of $500, omitted in published letter.
Vol. ii, p. 204, No. 56.

EXTRACTS OF LETTERS PROBABLY FROM SAMUEL CHASE:

1777.—*July 1, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 181. Vol. i, p. 327, No. 94.

LEE, ARTHUR, to GENERAL WASHINGTON:

1777.—*June 15, Berlin.* See "Life of Arthur Lee," Vol. i, p. 87.
Vol. i, pp. 321, 322, 320, No. 92.

LOVELL, J., to ——:

1778.—*December 10.* See "Life of Richard Henry Lee," Vol. ii, p. 145. Vol. ii, p. 124, No. 34.

LEE, CHARLES, to LORD PIERCY (a copy):

1775.—See "Life of Richard Henry Lee," Vol. i, p. 281. Vol. i, p. 171, No. 50.

LEE, R. H. (?), to GEORGE PYNCHEON and JOHN BRADFORD:

1777.—*October 16, York, Pa.* Arranging for transport of soldiers. Note in different handwriting. Speaks of Mr. Lee's financial straits. Vol. i, p. 351, No. 102.

SHIPPEN, WILLIAM, to HIS BROTHERS:

1776.—See "Life of Richard Henry Lee," Vol. ii, p. 170. Paragraph relating to family matters, omitted in published letters. Vol. i, p. 251, No. 72.

WASHINGTON, GEORGE, to a GENTLEMAN of VIRGINIA:

1787.—*July 19, Philadelphia.* See "Life of Richard Henry Lee," Vol. ii, p. 35. Vol. ii, p. 303, No. 81.

PAPERS OF RICHARD HENRY LEE.

1766.—*July 25, Westmoreland.*—To the Editor of the *Virginia Gazette.* See "Life of Richard Henry Lee," Vol. i, p. 40. Vol. i, p. 11, No. 4.

1766.—R. H. Lee's opinion concerning the authority of the Committee for King George's county. Vol. i, p. 5, No. 2.

1774.—*October 3.* A resolution moved by R. H. Lee concerning the appointing of a militia. See "Life of Richard Henry Lee," Vol. i, p. 112. Vol. i, p. 116, No. 34.

1775.—*May* –. Letter written by R. H. Lee on behalf of the Delegates of the City of London to the Lord Mayor. See "Life of Richard Henry Lee," Vol. i, p. 153. Vol. i, p. 139, No. 41.

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LEE, RICHARD HENRY (*continued*):

1776.—*October.* Proposed addition to the instructions given the Commissioners going to France, in R. H. Lee's handwriting. See "Life of Richard Henry Lee," Vol. i, p. 188.
Vol. i, p. 227, No. 65.

1776.—Address to the people of Virginia by Richard Henry Lee. See "Life of Richard Henry Lee," Vol. i, p. 37.
Vol. i, p. 257, No. 74.

1776.—A subscription paper drawn up by R. H. Lee, in testimony to Mr. Sear's patriotism. Signed by nine prominent men. Vol. i, p. 255, No. 73.

1777.—*October 21, Yorktown, in Pennsylvania.* Copy of letter by R. H. Lee for the Committee of Congress to Fort Pitt. Concerning the charges against Col. George Morgan.
Vol. ii, p. 7, No. 3.

OFFICIAL PAPERS.

1766.—*February 27.* Draught by R. H. Lee of the articles of the association by the citizens of Westmoreland. See "Life of Richard Henry Lee," Vol. i, p. 34.
Vol. i, p. 9, No. 3.

1776.—*December 29.* Circular letter to the States, draughted by R. H. Lee. See "Life of Richard Henry Lee," Vol i, p. 187. Extract from *Journal of Congress* on back of manuscript. Vol. i, p. 241, No. 69.

1776.—*December 21, Baltimore.* Letter to the Commissioners. See "Life of Richard Henry Lee," Vol. i, p. 285.
Vol. i, pp. 264, 263, 260, 261, 262, No. 76.

1776.—*December 30, Baltimore.* Letter to the Commissioners. See "Life of Richard Henry Lee," Vol. i, p. 290.
Vol. i, p. 259, No. 75.

1777.—*February 19, Baltimore. Letters to Commissioners in France.* See "Life of Richard Henry Lee," Vol. i, p. 291.
Vol. i, p. 283, No. 82.

OFFICIAL PAPERS (*continued*):

1777.—*April 10, Philadelphia. Letter from a Committee of Congress to General Washington.* See "Life of Richard Henry Lee," Vol. i, p. 284. Vol. i, p. 293, No. 85.

1778.—*Copy of a letter from Congress to the King's Commissioners.* Rejects peace as proffered by Great Britain. Vol. ii, p. 123, No. 36.

PETITIONS.

1774.—*March 26.* Petition to the House of Lords, protesting against the Massachusetts Acts. Signed by Sheriffs of London, Franklin, Izard, William Middleton, Arthur Lee and many others. See "Life of Richard Henry Lee," Vol. i, p. 268. Vol. i, p. 117, No. 35.

1775.—*April 5. Fragments of Petition to the King* (drawn up probably by Arthur Lee), beseeching him to dismiss certain ministers and advisors. Vol. i, p. 137, No. 40.

1775.—*Petition addressed to the King by the Lord Mayor, Aldermen and Commons of the City of London.* See "Life of Richard Henry Lee," Vol. i, p. 273. Vol. i, p. 175, No. 51. (Not quite finished in the MS.)

Stated Meeting, May 19, 1899.

Present, 27 members.

Vice-President WISTAR in the Chair.

Correspondence was submitted as follows:

A letter from Dr. Samuel G. Dixon, accepting election as a member of the Council.

A letter was also read from Mr. Dunbar D. Scott, asking for information concerning Messrs. Draper and Rittenhouse, former members of the Society.

Mr. W. V. McKean, on behalf of the Phillips Prize Essay Fund Committee, presented a report and submitted a list of names from which judges for the competition were to be selected.

A communication was read from the Special Committee appointed to pass upon Dr. R. Buti's paper "On an Interesting Fragment of the Book of the Dead," recommending the paper for publication in the PROCEEDINGS of the Society.

The death of Edward Goodfellow, of Washington, D. C., was announced.

On motion, the President was requested to appoint a suitable person to prepare an obituary notice of Alexander Biddle, a lately deceased member.

The proceedings of Officers and Council were then submitted.

Pending nominations for membership having been read, the Society proceeded to an election.

The Tellers then reported that, after a scrutiny of the ballots, the following candidates had been duly elected members of the Society:

Arthur V. Meigs, M.D., Philadelphia.
Samuel M. Vauclain, Philadelphia.
Prof. William Ramsay, Ph.D., London, Eng.
Israel W. Morris, Philadelphia.
John Cadwalader, Philadelphia.
Charles E. Dana, Philadelphia.
Prof. Francis C. Phillips, Allegheny, Pa.
Prof. Arthur S. MacKenzie, Ph.D., Bryn Mawr, Pa.
Prof. Joseph P. Remington, Philadelphia.
Prof. William C. Day, Ph.D., Swarthmore, Del. Co., Pa.
William Brooke Rawle, Philadelphia.
Prof. Marion D. Learned, Philadelphia.
Stuart Wood, Philadelphia.
Harrison S. Morris, Philadelphia.
Waldron Shapleigh, Ph.D., Philadelphia.
Prof. William A. Lamberton, Litt.Dr., Philadelphia.
Milton J. Greenman, M.D., Philadelphia.
Rt. Hon. Sir George O. Trevelyan, London.
Henry S. Pritchett, Washington, D. C.
Henri Poincaré, Paris.
James E. Keeler, Sc.D., Mt. Hamilton, Cal.

The Society was then adjourned by the presiding officer.